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National Petroleum News

News From Oil Industry Everywhere

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New Cars Bow For New York At 39th Show

By JOHN W. THOMPSON
N. P. N. Staff Writer

NEW YORK, Nov. 14. — Manhattan met the automotive industry head on when the 39th National Automobile Show and the fifth National Motor Truck Show opened for a week's run Nov. 11 to officially introduce the 1939 season.

The auto show, as has been the custom the past few years, was splattered about the town, with the main event, the National Show, being held at Grand Central Palace where approximately 200 models of 18 makes of passenger cars, 10 makes of commercial vehicles, and 50 exhibits of accessories, science, and safety demonstrations were on display.

Not far from the Palace, General Motors again set up its own show at the Waldorf-Astoria Hotel, where it is holding open house throughout the week, in addition to its Palace showing.

Similarly, the four Chrysler-built cars, besides being shown at the National Show, have been holding a "private-public" show in the Chrysler building during the current week.

Ford, not a member of the Automobile Manufacturers Assn. which sponsors the National Show, set up its own display in its factory sales room on Broadway.

At still another address—the Port of New York Authority building — The National Motor Truck Show was represented by over 100 exhibitors, including manufacturers of diesel engines, trucks, valves and fittings, truck tanks, trailers, a butane-propane engine, and many others. This show, the first to be held in New York City, has doubled its last year's requirements for exhibition space, and is trumpeted as the largest display ever gathered within a single industry.

New Faces For 1939

Of principal interest among the new faces for 1939 is the Ford-built Mercury 8, a V-8 with a 95-horsepower engine and a wheelbase 4 inches longer than the Ford 85. Other new chassis include a new low-priced Hupp six with body stamped from the old Cord dies, a small Oldsmobile six, a shorter Pontiac six to augment its regular six and eight lines, and a new Packard Super-Eight which is a consolidation of the 320-inch Super-Eight engine and the 120 chassis. The Packard 120, as well as the Six and the Twelve, are continued.

Without doubt, the remote control gear shift, now avail-

(Continued on page 6)

MOTORDOM'S 1939 PREVIEW

John W. Thompson, automotive expert writing exclusively for NATIONAL PETROLEUM NEWS, has spent the past week in New York attending the national truck and passenger car shows. NPN Staff Writer Thompson's complete, first-hand account of the exhibits of new cars, truck improvements, and auxiliary equipment, plus a concise review of the 1939 automotive field — profusely illustrated — will be featured in the Nov. 23rd issue of NPN.

Look for these features NEXT WEEK in NPN.

Will 'Bob' Jackson Succeed Cummings?

By Teletype
N. P. N. News Bureau

WASHINGTON, Nov. 15. — Attorney General Homer Cummings will leave his post "sometime in January" to resume the practice of private law. The appointment to succeed him is expected to go to Solicitor General Robert H. Jackson, who, as head of the anti-trust division, was in charge of the Madison oil prosecutions.

President Roosevelt said late today Cummings has sought for some time to be allowed to resign to return to private practice, but that he, the President, has urged him to remain. However, he said, he has decided to "let him go" sometime in January. The President would not confirm reports that Jackson would be appointed to succeed Cummings, although some attaches of the Justice Department indicated their belief Jackson would be the choice for the post.

Oil's 1939 Prospects Discussed at A. P. I.

By Teletype
By V. B. GUTHRIE
N.P.N. Managing Editor

CHICAGO, Nov. 15.—The oil industry as represented at the 19th annual convention of the American Petroleum Institute here this week, set its sights on the 1939 outlook for demand for its products and heard suggestions as to general operating policies that might tend to make the coming year more stable for the oil industry than 1938 has been.

Attendance at the meeting the second day was nearly 1850, as compared with about 1700 on the second day of last year's meeting.

An average of 27,350,000 motor vehicles may be expected to be in use during next year, the Institute's statistical department estimated, an increase of 1.2 per cent over the number in use, on the averag during 1938. An increase next year in per-vehicle consumption of three per cent may be expected, it was estimated. The increase in total domestic dmand for gasoline may be as much as four per cent.

Even more favorable prospects are in sight for the heating oil business. The institute here estimated an increase of 15 per cent in consumption in the period from Oct. 1 to March 31.

Crude oil, gasoline and distillate stocks were reported at fairly sound levels and the pick-up in business is expected to bring relief to heavy fuel oil and lubricating oil stocks, which have been burdensome throughout 1938.

Avoid Excess Stocks

It was suggested, by Axtell J. Byles, president of the institute, in his annual address, to be presented Nov. 16, that refiners avoid excessive runs to stills in the winter months, to avoid piling up surplus inventories as happened last winter.

Runs to stills of not more than 3,100,000 barrels a day on an average over the winter season, was suggested as an operating schedule that will hold gasoline stocks next spring to minimum economic requirements.

It was further suggested that crude requirements this winter be taken entirely from current production, rather than from stocks, in part, to give as much relief as possible to crude oil producers.

For a longer range policy, it was suggested, to achieve stability in tne oil industry, that all oil-producing states come into the interstate oil compact and that these states individually enact legislation which would also allow the control by the states'

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agencies of the drilling unnecessary wells.

Reporting to the institute directors today on the work of the American Petroleum Industries Committee, which heads up the oil industry's work on taxation and legislative matters, Baird H. Markham, director of the committee, suggested a long range highway building program for the nation, with an equitable apportionment of the cost between the motorist taxpayers and other groups benefitting.

"State and federal highways, local roads and city streets benefit others besides motorists and these other groups should all share in the cost of construction and maintenance of these arteries," Markham told the institute directors.

Markham warned that, in the immediate future, there will be greater pressure for gasoline tax increases in certain states.

"There is considerable agitation in some states for such increases to match federal highway aid, for additional highway construction and to finance general governmental functions," he stated. "Each business recession proportionately reduces the yield of the established revenue sources, thus prompting the resort to more stable revenue sources such as the motor fuel tax."

There is an increasing demand for the erection of rigid constitutional and legal barriers against the diversion of the motorists' tax funds for other purposes than highway improvement, said Markham.

New Cars Make Bow For New York Show

(*Continued from page* 5)

able either as optional or standard equipment on most 1939 cars, held the spotlight at the Shows. With the exception of Chevrolet, which is operated with a vacuum booster, these shift levers are manually operated and are similar in principle to the type introduced on the 1938 models by Pontiac, LaSalle and Cadillac.

Another eyebrow-raiser to the general public was the adoption by Ford of hydraulic brakes on all models except the large Lincoln. The Overland, previously known as the Willys, has also adopted hydraulic brakes.

While the New York Show formerly led the openings of shows in other cities by a week, this year finds 1939 auto shows opening simultaneously with the New York exhibit in 18 cities throughout the country.

Drilling Pace Slowed Down As Potential Output Grows

TULSA, Nov. 12.—Huge potential production in several of the principal producing states, constant decreases in allowable production per well and the recent reduction in crude oil prices have combined to cause much re-figuring in company plans for next year's development.

The signs now point definitely to further decrease in drilling. The decline has gone on all this year, following the big campaign of 1937 which increased potential production so greatly that the prorated states had to resort to the most drastic reductions adopted so far to hold output somewhere in line with demand.

Drilling campaigns are now being shaped for 1939. Companies are taking into consideration the probable pay-out period on each contemplated new well; in many an instance they are deferring drilling wherever possible. Some locations must be drilled because of offset requirements. There is some return now to the practice of several years ago of paying offset royalties to the landowner and delaying drilling of a well.

It is probable that the holding down of drilling will not be confined to proved locations but that wildcatting will be restrained. It has been customary in all discussions of development restriction, such as have been conducted under the auspices of the American Petroleum Institute and the Independent Petroleum Association of America, to place emphasis upon development in known fields. On occasion there has been expression that wildcatting should be continued to the end that reserves might be greater.

But the establishment of reserves calls for large cash outlays, just as the establishment of the U. S. government's gold reserve at Fort Knox has called for huge expenditures. Proved oil reserves that cannot be marketed mean investment that is idle. Reserves, by most of the calculations, now are higher in this country than ever before, despite recurrent alarmist statements that the end of the U. S. petroleum suppiy is in sight.

Thus, many a company is working today to take care of expiring leases on some basis other than drilling. Renewals are being obtained; much of the acreage in areas remote from production, taken originally just to have protection in the event that somebody drilled a producing wildcat, is being dropped. It can be picked up again if the area ever gets "hot" and probably at cost not greatly exceeding what would be represented by cumulative rentals.

Drilling Off 17%

A late figure on drilling operations on the oil states east of California, including Illinois, shows a decline of 17 per cent in field work. The date of the survey was Nov. 4 and the total was 2708 wells drilling, rigs up and drilling wells shut down, compared to 3271 on Nov. 4, 1937. In this count, operations in Michigan and Kentucky were not included. Except for these, all states east of California that are not purely routine in development are included.

Illinois, of course, has gained greatly in operations. On Nov. 4, 1937, there were 139 wells, rigs and shutdowns. On the same date this year there were 415. Drilling is now showing signs of falling off in Illinois, chiefly because of cold and wet weather, a real deterrent in the Illinois basin.

The decline in Kansas operations was great, comparing the status on the foregoing dates. The figure for last Nov. 4 was 186, for the same date last year it was 423. Contraction of the Kansas market — current production having to compete with Illinois and Michigan increases in output and with storage withdrawals — brought about the shrinkage in operations. Allowables are low, both total for the state and per well, pipeline proration has been present most of this year, and pay-out periods for new wells in western Kansas have gradually increased until incentive for new drilling has all but disappeared. Most of the current operations are of the forced variety.

North Louisiana has declined in drilling, 85 operations against 117, but field work in the coastal area is practically the same as last year at this time. The recent report shows 148 operations against 152 on the same date last year.

Field work in New Mexico is a little brisker now than a year ago, the figures being 163 against 143.

Illinois Competition Blamed

Oklahoma, like Kansas, has felt the competition of Illinois and Michigan. The decline to 373 operations from 435 on Nov. 4, 1937, reflects this competition as well as the fact that Oklahoma's development now is quite scattered, with no single field calling for much drilling. First-rank discoveries have been rare since Oklahoma City came in.

Texas, having established a reserve adequate to supply its markets for considerable time—so great that Saturday and Sunday shutdowns have been in effect much of this year — also shows a falling off in drilling. The count of total field operations on Nov. 4 was 1231, compared to 1719 on the same date in 1937, a drop of 28 per cent. The loss was general over the state except in north Texas, where the K. M. A. field has brought about a big gain over last year's drilling.

More Oil Interests Seized By Mexicans

By Teletype
N. P. N. News Bureau

NEW YORK, Nov. 15.—Since the expropriation March 18 of 17 American and British controlled oil companies operating in Mexico, the Mexican government has continued to take over foreign controlled oil interests which were not listed in the original expropriation decree, it was learned here at main offices of the Standard Oil Co. of New Jersey.

Ten production companies, some of which have been producing crude, others having extensive land holdings have been added to the original list of 17. They are: Cia Petrolera Minerva, S. A.; Cia Petrolera Titania, S. A.; Cia Transcontinental de Petroleo, S. A.; Doheney Bridge Y Cia; Green Y Cia; Mexican Petroleum Co., (Calif.); Tamiahua Petroleum Co.; Tuxpan Petroleum Co., Cia Petrolera Ulises, S. A.; and J. A. Brown, S. En C.

O'Mahoney Hearing Starts In December

N. P. N. News Bureau

WASHINGTON, Nov. 14.—Hearings of the O'Mahoney monopoly committee, which had been tentatively scheduled to begin sometime after the middle of November, now will probably not begin before the first week in December, Chairman O'Mahoney said as he left a conference at the White House today.

The Wyoming senator said the hearings will continue to the holidays, then recess until early in January.

This change in plans, it was indicated, will probably throw the beginning of oil's appearance before the committee, originally figured for mid-December, into 1939. However, committee attaches declined to confirm or deny this specifically.

Byles Predicts 1939 will be Good Year for Oil

He Urges Avoidance of 'Excess' Stocks Which Burdened Industry Last Winter

N. P. N. News Bureau

CHICAGO, Nov. 15.—Oil industry operating policies and policies the oil industry might follow in its relations with government and with the public, as suggested by Axtell J. Byles, president of the American Petroleum Institute, in his address to be presented at the general session of the institute's convention Nov. 16, include the following:

That further liquidation of crude oil stocks be avoided during the coming winter season and that the crude requirements of refiners be taken entirely from current production, to give as much relief as possible to the oil producers.

That average runs to stills this winter of not over 3,100,000 barrels a day, will result in only slightly higher inventories of gasoline on next March 31 than minimum economic requirements call for.

That the Interstate Oil Compact be continued and that all producing states become members of the compact and that the conservation laws of the producing states be amended to make possible proper well spacing and thus the avoidance of the drilling of unnecessary wells, as well as the proration of production itself, in the interests of conservation.

That the public relations work of oil companies be directed principally at "domestic" relations, for the education of those engaged in the industry itself and secondly in a campaign for better understanding on the part of the public.

The above points were not set forth by Byles specifically as a program for oil companies to follow, but they were suggestions contained in his address, which discussed generally the economic position of the industry today. Some of these points have been recently brought up from other sources as policies the industry might follow to achieve progress toward the goal of greater stability.

Comments on Compact

With regard to the suggestion that refining operations be brought within the scope of the Interstate Oil Compact, as brought out at the recent conference of President Roosevelt and Col. Ernest O. Thompson, chairman of the Texas Railroad Commission, and also chairman of the compact commission, President Byle's address contained no specific comment. It did have this to say, however, in general terms, with regard to enlargement of the scope of the compact:

"The industry is properly giving much thought as to what, if any, amendments or enlargements will improve its usefulness. It is not necessary, or, in my opinion, wise to come to a final decision on these matters. Study and discussion should continue, but I cannot refrain from here commenting that I doubt whether an agreement giving the Compact Commission mandatory powers is either legal, practicable or desirable.

"A sovereign state is not permitted to surrender its police power. Such power can only be used incident to the conservation of petroleum by the individual state in regard to drilling permits, well-spacing, sound engineering practices and well production allowables, in such ways as to do equity and prevent waste.

"The usefulness, influence and strength of the Interstate Compact rest upon the democratic processes of study, discussion, education and moral influence. Nor can I see why any producing state which desires to serve the general interests and safeguard its own should hesitate to join and sit at the conference table."

With regard to the confiscation of American and British-owned oil properties by the Mexican government, Byles' address stated attention should be drawn to the "appalling consequences to this nation should this practice be permitted to spread to the vast American holdings in South America and elsewhere."

On Confiscated Oil

"Mexican oil is now coming into the United States in seemingly increasing quantities," stated his address. "This oil is said to be coming from government-owned wells. It is difficult, to say the least, to differentiate between the sale of confiscated or stolen oil and oil the sale of which is made possible through ability to replace it with confiscated or stolen oil.

"It is well known that government-owned wells in Mexico are not nearly sufficient to supply the raw material from which Mexico's home consumption of refined products is made. This makes it doubly difficult to understand how the oil now being imported into the United States can be of clean moral title, to say the least.

"Vast petroleum reserves in Mexico and in Central and South America, owned by citizens of the United States, are at our gates, cheaply and immediately available to the American consumer if, as and when they are needed in times of peace, and to our government in time of war—unless they are confiscated."

In periods of abundance of available crude oil production, such as have existed in this country for many years, Byles stated that, as a general rule, the nearer aboveground supplies approach minimum economic working requirements, the better conditions for the industry.

"Under present circumstances," Byles' address continued, "with crude oil inventories approaching 275,000,000 barrels, have not crude stocks attained a relationship to economic levels which will, in all probability, make unnecessary and unwise further liquidation during the winter months and thus give relief to the producer in meeting current requirements of crude oil?"

Stocks Figure Given

Economic requirements of finished and unfinished gasoline on next March 31, it was said, would probably not exceed 80,000,000 barrels and that that volume of inventories would also leave room for a seasonal buildup with which to augment current supply during the 1939 high consuming months. Inventories on Nov. 1, it was said, were about 68,000,000 barrels, approximately the same amount as a year ago. To achieve the economically desirable figure of 80,000,000 barrels in inventories on March 31, Byles said that runs to stills should not be over 3,100,000 barrels daily over the winter period.

"With crude oil and gasoline inventories now at fairly economic levels and the distillate inventories sound," stated Byles' address, "the only really burdensome inventory conditions remaining are those of residual fuel and lubricating oils. The pickup in general business, if it continues as is hoped, will bring relief to these situations.

"In other words, the industry, while passing through the uncertainties and unpleasantness of the past summer, nevertheless did, to a large extent, liquidate the excesses of the previous year and should be able to look forward to an improved position in 1939. However, this hope will not be realized, or this service rendered, if March 31 next finds the industry burdened, as it was last March, with uneconomic inventories."

Concerning the relationship of the proration program to crude oil prices, Byles stated in his address he believed that conservation, through proration based upon proper well spacing and production practices will not bring fixed or pegged crude oil prices. From time to time, the power of a flexible price will and should take charge of the situation, his address stated, encouraging or discouraging development and production, thus tending to keep them within economic requirements.

Moderate Price Swings

"This industry has no right to special price consideration other than that essential to prevent physical waste. It seems to me, however, that under proper con-

OIL'S OUTLOOK FOR 1939

CHICAGO, Nov. 15.—The oil industry should be able to look forward to an improved position in 1939, stated Axtell J. Byles, president of the American Petroleum Institute, in his annual address to the institute convention here.

"With crude oil and gasoline inventories now at fairly economic levels and the distillate inventories sound, the only really burdensome inventory conditions remaining are those of residual fuel and lubricating oils," his address stated.

"The pickup in general business, if it continues as is hoped, will bring relief to these situations. In other words, the industry, while passing through the uncertainties and unpleasantness of the past summer, did, nevertheless, to a large extent, liquidate the excesses of the previous year and should be able to look forward to an improved position in 1939. However, this hope will not be realized, or this service rendered, if March 31st next finds the industry burdened, as it was last March, with uneconomic inventories."

Oil's Real Crisis Is The Threat Of Government Control, Says Pew

N. P. N. News Bureau

CHICAGO, Nov. 15.—The real crisis that menaces the oil industry is to be found in the tendency of government to control more and more of industry and thus narrow the field that is left open to free enterprise, J. Howard Pew of Philadelphia, president of the Sun Oil Co., was to tell the American Petroleum Institute convention here Nov. 17.

"No economic planning authority could ever have foreseen, planned, plotted and organized such an amazing spectacle of industrial progress as the world has witnessed in the last century," Pew stated in his prepared address, entitled The Oil Industry; A Living Monument to the American System of Free Enterprise.

"No trust or combination, private or governmental, could have accomplished it. It could have been achieved only under conditions of wide open invitation to all the genius, inventive ability, organizing capacity and managerial skill of a great people."

servation practices, much narrower swings in the price trend are likely to occur than were experienced prior to production under proration."

In a brief discussion, in his address, of the various remedies proposed for the present ills of the oil industry, such as divorcement of pipelines, divorcement of marketing, and so on, Byles' address stated these would lead to disruption and disintegration and add to consumer costs. He said the entire oil industry, from the stripper well to the small independent service station, is part of an integrated industry and that every man in the industry should consider carefully whether the various remedies proposed would benefit him or hurt him in the long run and also what their effect would be on the consumers of petroleum products.

'Domestic Relations Program'

"It is difficult for anyone to envisage the complete economics of so vast, complicated and sensitive an undertaking as the petroleum industry," Byles' address concluded. "It is particularly difficult for anyone engaged in but one branch of the industry to see the effect which the fulfillment of all his desires would have upon the other branches and consequently upon the whole undertaking, including himself. This leads me to remark that there is but one greater need for this industry than a campaign of sound, accurate and honest public relations, which would result in better public understanding. That greater need is for such a campaign in what we might term domestic relations, for the education of those engaged in the industry itself."

Pew emphasized the narrowing of the field left open to free enterprise by citing the railroads, with their rates, wage scales and finances under the control of government; the other public utilities, the banks, insurance companies and investment concerns, and the merchant marine — all practically closed now to free enterprise and the operation of natural economic law.

"Even in that most elemental and least integrated of all industries — agriculture — we see that the hard, unimaginative authority of government, experimenting this year with one nostrum and the next year with another, has produced all the symptoms of creeping paralysis," stated Pew's address.

The Automotive Group

It was to the automotive group, including petroleum, that Pew turned for his most striking example of the industrial trend of the present century, showing its highly competitive character.

"In that competition we have seen how the rugged individualist, Henry Ford, sturdily independent of finance capitalism, stock market appeal, or banking support, has found his place, maintained his independence and reared an industrial structure that is one of the wonders of the business world," his address stated.

"Yet right alongside of Henry Ford we have seen a score of great corporate concerns raising their capital from millions of investors and building up the same kind of business to the same pinnacle of success, in the entirely different atmosphere of corporate organization."

At the end of 1937, General Motors Corp. was owned by 375,755 stockholders, the Ford business by three. "So long as such widely divergent types can grow and flourish, monopoly will be impossible," it was stated.

Pew in his address pointed to the history of the Sun Oil Co., its controlling ownership and management having always been held within a single family, its operations, he said, representing about three per cent of the petroleum industry in this country.

"It is only about 13 years since we produced and marketed gasoline," his address stated. "At that time the industry, as we promptly learned, had grown to full adult stature: and we were left no room to doubt that it was thoroughly competitive. Nevertheless, our hopeful little enterprise was able to make a place for itself. We found no monopoly to freeze us out and no excesses of competition to starve us out. We have never assumed a divine right to a place and a share in the industry. If somebody else could serve the public better in quality or price, he was entitled to the business."

Big Volume, Low Cost

Pew's address cited figures to show that the aim of the entire group of automotive industries had always been big volume, mass production and low unit costs. Under that formula, it was stated, the automobile manufacturers, within a few years, have put 30,000,000 cars on the roads. In 1909, the average passenger car's wholesale value was $1252, in 1935 it was $527, a reduction of 58 per cent, it was pointed out.

The car buyer in 1925 paid on an average of $31.50 per horsepower: in 1937 he paid $8.60, it was shown, a reduction of 72 per cent. Today the car's expectation of life is twice what it was 25 years ago. The tire which cost $20 or $22 in 1914 now costs $12 or $13 and is good for 25,000 miles or more, while the 1914 tire was good for 3500 to 4000 miles.

The cost of owning and operating a car today, mile for mile, it was shown, is about one-fourth of what it was 20 years ago and special taxes on the car and its fuel have built the roads on which it operates.

"The automotive industries have served the public well," Pew's address stated. "They are free from monopoly and competition has been a chief factor. Nevertheless, there is demand for government to invade the oil industry's field with measures which, under the guise of helpful 'regulation,' would before long develop the paralyzing rigidities of government control."

Pew stated it was his feeling that, if the great concerns can operate in the public interest, within our free enterprise system, they should not be molested merely because of their size. However, he said he believed that the smaller units must be fostered and given sufficient encouragement that they will always be part of our system.

"The small units of today will be the large units of tomorrow," his address stated. "Through them industry and enterprise must receive constant infusion of new blood, new talent, new energy and ever-widening outlook. We must have the smaller units as well as the larger, complementing each other and together giving us a properly rounded and co-ordinated business structure. The discouragement of small business would shortly precipitate conditions in which all enterprise would be smothered."

Refutes Monopoly Charge

Pew's address cited data as to the relative prices for the oil industry's products, its wages and employment record through the depression and its return on its invested capital, to refute the charges that a monopoly exists in the oil industry.

Oil industry products in June, 1938, stood at a commodity price index of 56.3, while the index for all commodities was 78.3. In 1926, generally accepted as the post-war year of best equilibrium in prices, the average service station price of gasoline, ex-tax, was 20.97 cents a gallon. On last Oct. 1, the national average price was 13.76 cents, for a much higher quality of motor fuel.

An analysis of earnings of oil companies from 1921 to 1936 shows that the industry had deficits in four years and profits in 12 years, it was pointed out. The highest yearly return on capital was 4.96 per cent, average yearly earnings were 1.357 per cent.

Department of Labor Statistics, it was pointed out, show that the payroll of oil refining companies in 1937 exceeded 1929 by over $20,000,000, and that the average hourly refinery pay in 1937 was 97.2 cents, which was more than 50 per cent over 1929 and the highest rate paid in any manufacturing industry.

Describing the place of the oil

industry in this country, Pew's address stated it had been built around the theory of big and expanding production at low and constantly lower prices. "It is not only our biggest single industry but it is our most impressive monument to the efficiency of unstinted competition," Pew's address stated. "I mean the kind of competition that is always looking for better methods, improved processes, invention, discovery—that seizes upon every new idea looking to lower costs, better products, wider markets—that always gives the consumer the benefit of better goods at lower prices. It is the kind of competition that has demanded millions every year for work in laboratories and experimental plants—that has endowed scientific study and tireless research.

"From one point of view it has been expensive competition, for it has demanded a constant reorganization and modernization of plants and processes to keep them in step. The establishment that is today a last word in progress and has cost millions is likely to be outmoded by next year: it must be brought up to date on pain of being elbowed out of the race. Yet this seeming wastefulness is in truth the essence of sound industrial economy. The fraction of a cent of saving per gallon, or the shade of improvement in quality, is quickly multiplied into wider acceptance, expanding volume and strengthened position. These are the things which keep us constantly on the keen edge of competition and which make competition a good thing."

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Horseless Buggy would Have Fared Badly With Planners

N. P. N. News Bureau

CHICAGO, Nov. 15.—A picture of how a National Planning Board in 1900—had there been such an agency of government in that year—might have looked upon the future of the automobile and oil industries, in the light of the country's experience with such boards recently, was contained in the address of J. Howard Pew, president of the Sun Oil Co., to be presented at institute convention here.

"There were then in operation in this country some 8000 motor cars, consuming 80,000 barrels of gasoline in a year," his address stated. "That is just about enough gasoline to keep the cars of today in operation for one hour and a half.

"Let us imagine Mr. Ford, with his great vision of the automobile's future, appearing before that board and asking that, in its program for the next two or three decades, it provide a few billions of dollars of capital, along with the necessary labor and material, for his industry.

"The board would have recognized in Mr. Ford a mild lunatic. They would have asked him where he expected to get the gasoline for all those cars, and would have pointed out that neither the gasoline, nor the crude oil from which to make it was anywhere in sight. And they would have rejected Mr. Ford's demands. A sophisticated public would have laughed at Ford when the board set down genius as insanity and inventive ability as lunacy—and that would have ended all foolish talk about horseless carriages and flying machines.

"But, fortunately for these 20,000,000 families in this country who derive pleasure and satisfaction from the operation of their cars, there was no such board in 1900. And so, Mr. Ford, not worrying about where his gasoline was coming from, went right ahead building more cars and better cars, until presently he was turning out over 1,000,000 cars a year.

"Fortunately also for the oil industry, there was no such board, for the industry went right ahead drilling more wells and deeper wells, and sometimes finding oil. Oil men brought technology to their assistance in the form of geology and geophysics and by their aid discovered new oil fields.

"In order to get the gasoline into the consumer's car at the lowest possible cost, they built tens of thousands of miles of pipelines which carried the crude oil from the well and stored it at central points. They invented, developed and built hundreds of great tank steamers, which have now become the lowest cost transportation units in the world.

"They built finer, larger, more complex and more efficient refineries; and then they built more pipelines to take the gasoline from the refineries, where it was eventually loaded into tank trucks and delivered to those hundreds of thousands of filling stations throughout the land.

"And so the oil industry, doing each year those things which would have been impossible the year before, was always able to keep just ahead of the thirst for gasoline of those multiplying millions of automobiles."

The Leaks you don't see Cost you Money

MOST men think they keep a close eye on their plants and their businesses and see ALL the losses.

But eyes and mind become blind from looking too thoughtlessly at the same piece of equipment day after day. It's a trait of human nature that the defects are frequently overlooked.

Regular inspections with a set of questions in your hand that MAKE YOU LOOK with SUSPICION and DOUBT at every part of every piece of equipment is the way to discover those costly leaks that ordinarily you don't see.

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National Petroleum News

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Oil's Problems Are Too Critical For Further Heated Talk

By WARREN C. PLATT, Editor

Oil has a number of pressing problems that need considerate and comprehensive argument and calm judgement. These, the problems have not been getting. Perhaps, however, they will as a result of the conservative turn that last week's general election gave to political affairs.

Commentators seem to agree pretty much that the election registered definite disapproval by the American people of the extra rapid movement toward government control of all business, which the New Deal part of the Democratic Party had been espousing. Also, that the election could be considered disapproval of the ruthlessness of minorities who, with strong statements, inflammatory charges, and generally a lack of facts, have been demanding reforms for their alleged financial benefit, "In the name of the Great Jehovah and the Continental Congress" to quote a famous demand for surrender back in revolutionary war days. Denial of these demands has of late been generally declared to be sacrilegious and treason and the deniers have been called upon to hurry off to the guillotine.

Here in the oil industry there has been a measure, to say the least, of intemperate talk and demands on subjects that are far too serious to be considered in any such fashion. Under these subjects are questions of perhaps the greatest consequence to the whole industry in its history.

The election, it is to be hoped, will cause the various governmental agencies to temper their efforts with business with greater regard for light and less desire to "put on the heat."

It also is to be hoped that the election will cause the representatives of American industry, and of the oil industry, to be more insistent about their rights, when dealing with government, and to insist upon telling all of their story, and on giving all of the facts essential to proper consideration of the subject. If the particular arm of government thus addressed will not receive that story, then they should not hesitate to take it to the public.

The public has, we believe it is fair to conclude, plainly said that some of the shows put on by government in the public's name, have not been fair. Not the least of these protestants is President Roosevelt himself, who objected when the Dies committee hit his friend the governor of Michigan. Prior to election the protesting witness seeking his rights had little chance of withstanding the onslaught of the champions of the "common man," but, it is to be hoped, since election, the story will be different. If so, the public and industry as well, will benefit from courageous witnesses stating the facts, regardless how they may fit into some bureaucrat's scheme of things.

Today there is before the oil industry and the public these paramount questions that will determine the course of the industry and affect considerably the course of all business:

Conservation of oil and other natural resources.

Divorcement of pipe lines from production and refining.

Divorcement of marketing from other branches.

Price maintenance for gasoline.

Licensing of service stations.

Refinery control by government.

Each of these subjects leads into many important matters. They should receive the best thought and all the facts the industry is capable of. These facts should be discussed intelligently and by all.

Today, unfortunately, too many oil men who have taken a position in regard to one or more of these problems, know too little about the subjects. Opinions have been stated and resolutions adopted on a deplorably meager showing of facts which failed by a mile of giving a fair picture of the problem passed upon.

Take the subject of conservation for instance. Much has been said and written about it for many years but unfortunately mostly in language understandable only by men expert in oil production. Yet the whole oil industry has a definite interest in the matter, for undoubtedly it is providing the most direct road by which government will increase its supervision of the oil industry. The distance the government will travel down that road will be determined largely by the extent to which the industry understands the fundamental problems involved and how successfully, from the public's standpoint, the industry grapples with those problems.

Many oil men far removed from the producing fields, sincerely believe the present conservation measures are only a scheme of the major oil companies to "monopolize" crude, as they say, and to fix its price to the small man's detriment.

That conservation measures are founded on the best of scientific and technical knowledge is not appreciated by these men; that it represents the public exercising whatever "rights" the public has in our natural resources, and that in exercise of these "rights"—whatever they are and however great they may become in future years—the public through its state and national governments, is daily approaching a greater and greater restrictive control on the industry—all this does not seem to be fully sensed by these men who are far away from an oil well.

That other countries, particularly Mexico, have long declared and exerted all of their "rights" to their oil and gas deposits, with results that would hardly be called satisfactory by the average oil men condemning our present conservation activities, is not appreciated by many of those in this country who would abolish all "conservation" measures.

If ever a subject cried out for facts to every one, it is this one of oil conservation.

This publication has not plan or solution for the problem of oil conservation, but it has a firm and serious conviction that the American people, through their governments, both state and national, will more and more increase their influence on this oil industry through exercise of their "rights" to the

oil and natural gas in the ground. Nor can the oil industry stop the American people in this, nor perhaps should it try.

However is there not a definite obligation on the oil industry to use its great knowledge of the subject to make sure that, as the American people attempt to exercise these "rights", that they do so in ways to the best interests of the entire country, which means also to those Americans in the oil industry everywhere?

Therefore the immediate need for the facts, all the facts and discussed free from intolerance.

Wisconsin's Good Fortune

The entire oil industry, we hope, sent Julius P. Heil, truck tank maker, Milwaukee, Wis., a telegram last Wednesday morning on his election to be the Republican governor of Wisconsin.

And the entire oil industry, we know, will assure the people of Wisconsin that the product Julius Heil will supply them will be A-1, of the best of thought, sound as to principle and practical and long-wearing as to quality and workmanship.

The oil industry knows—for more than 30 years now it has been using Julius Heil's tanks. First they were put on horse drawn wagons for kerosine. Then they were placed on trucks. Today they roll on the streets of probably all cities and most towns. But wherever they are is a well-pleased and satisfied purchaser.

Man cannot make an honest product for all these years and not command the respect of his fellow man. So, while Julius Heil's tanks were well and favorably known outside of Wisconsin, it seems that he had been accumulating a reputation, as sound and as sturdy and as confidence-building as his tanks, within the state. His reputation would have to be all of that to defeat the LaFollette machine, as he did.

This turning of the heretofore radical state of Wisconsin to Julius Heil, is to our minds, one of the most interesting events of election day. He represents pretty much the antithesis of the LaFollette regime and his campaign, we are told, was pretty much a contrast, minus the florid talk and claims and charges of the typical LaFollette fight.

Julius Heil promised the voters only what he could give and just what he will give, a sound business-like administration, the same that made him a successful manufacturer. This, we know, the people of Wisconsin will get and in this they will be most fortunate. W.C.P.

Oil's WASHINGTON CALENDAR

Below are given the dates and notices of hearings, proceedings, new legislation, etc., which are of importance to oil companies. Notice is also given of regulations issued, interpretations of laws, new publications, etc., with information as to how readers may secure official copies of these.

Hearings:

Interstate Commerce Commission:

Nov. 21—Proposed rules for trucking of explosives and inflammables.

Nov. 28—Protests of Gulf Pipe Line Co. of Oklahoma, Gulf Pipe Line Co. of Pennsylvania and pipeline division, Gulf Refining Co. of Louisiana, against tentative valuation of properties.

Nov. 30—Complaint of Standard Oil Co. of Louisiana against rail freight rates to midwestern points (at New Orleans).

Dec. 1—Protest of Standard Pipe Line Co. against tentative valuation of its properties.

Dec. 1—Railroads proposal to cut rates from New Orleans-Baton Rouge Group points to Tennessee River points (at Memphis).

Jan. 9—First of series of hearings on question of need for safety regulations for private truckers (Washington). Further hearings as follows:

Jan. 12—New York City.
Jan. 16—Chicago, Ill.
Jan. 19—Minneapolis, Minn.
Jan. 23—Spokane, Wash.
Jan. 25—Portland, Ore.
Jan. 30—Los Angeles, Calif.
Feb. 3—Omaha, Nebr.
Feb. 6—Memphis, Tenn.

Arguments:

Interstate Commerce Commission:

Dec. 15—To determine extent of ICC jurisdiction over employes (other than drivers) common, contract and private truckers.

Washington Scene Reflects Changes Wrought by Voters

N. P. N. News Bureau

WASHINGTON, Nov. 14.—Effect on the oil industry of last week's elections, which shuffled a good many Congressional seats from the Democratic over to the Republican side and substituted G. O. P. state administrations for Democrat administrations in a number of commonwealths, can hardly be summarized this soon after the balloting. But a number of facts culled from election reports reaching here may be indicative.

The turnover in Congress did not affect so many members who figured in last session's legislative attempts—successful and otherwise—of interest to the oil industry, but the anticipated trend toward a more conservative viewpoint in federal legislation at the next session may block passage of some "leftish" measures.

But while the national picture may not be greatly changed as to detail, there are several states from which election returns should be heartening to the industry generally.

Voters of California, Michigan and New Hampshire went to the polls and placed their stamp of approval on amendments to the states' constitutions prohibiting diversion of highway funds to other than highway uses. In Alabama a similar proposal failed. A referendum which would have increased Missouri's gasoline tax likewise was defeated.

At least two of the newly elected Republican governors have definitely expressed themselves as opposed to diversion—Saltonstall of Massachusetts and Wilson of Iowa.

Another gubernatorial changeover which may change the legislative, or regulative, aspect for the oil industry in at least one state — Pennsylvania — is the decision of the voters to substitute Republican James for New-Dealer Earle, father of the "Pennsylvania oil investigation." Some observers expect that the oil probe may not be continued.

James, however, is a resident of Plymouth, Pa., in the anthracite region. Whether this fact will have any effect on his treatment of the oil industry remains to be seen.

Gillette Re-Elected

The Washington scene, may be summed up briefly:

Sen. Gillette, Ia., co-author of unsuccessful bill in last session to divorce marketing from other branches of petroleum industry, re-elected.

Sen. McCarran, Nev., whose subcommittee held hearings on Gillette's bill, re-elected.

Sen. Lonergan, Conn., author of unsuccessful strict federal-policing anti-stream-pollution measure which he hoped to press at coming session, defeated.

Sen. Nye, N. D., author of unsuccessful Nye resolution to have U. S. assert title to oil-bearing tidelands, sought by Navy, re-elected.

Sen. Bulkley, O., superhighway enthusiast, defeated.

Rep. Pat Boland, Pa., author of several-times-unsuccessful bill to tax fuel oil at rate of a cent a gallon, re-elected by narrow margin.

Rep. Doughton, N. C., Ways and Means Committee chairman, who says gasoline tax is "temporary," but includes it in each year's tax bill; and who refused to have any part of Boland's fuel oil tax as a part of the revenue bill last session, re-elected.

Biermann Defeated

Rep. Biermann, Ia., co-author with Sen. Gillette of unsuccessful oil marketing divorcement bill, defeated.

Rep. Cole, Md., chairman of "Cole Oil Subcommittee" which investigated oil industry in 1935, and to which was referred Biermann-Gillette bill at last session, but no action taken, re-elected.

Rep. Coffee, Wash., author of unsuccessful bill to repeal Connally "hot" oil law, re-elected.

Rep. Houston, Kans., author of unsuccessful bill to increase crude oil import tax when buyers don't take all domestic production, re-elected.*

Rep. Hobbs, Ala., friend of Navy-Interior plan to have U. S. seize tide-covered oil lands, re-elected.

Rep. Lea, Calif., chairman of House Interstate Commerce committee, author of successful Lea Natural Gas Act; author of unsuccessful "fuel research" (alkyl gas) bill, re-elected.

Rep. Harrington, Calif., co-author, with Sen. Gillette, of unsuccessful bill to exempt alkygas from gasoline tax, re-elected.*

Rep. Knutson, Minn., author of unsuccessful bill to outlaw all gasoline not blended with alcohol, re-elected.

Rep. Scott, Calif., author of unsuccessful bill providing federal aid for consumer co-operatives, re-elected.*

*Indicates result still in doubt.

California Elections Foreshadow Oil Legislation

Hike in Royalties, Oil Taxes Looms; Hopes for Oil Proration Bill Dimmed

By J. N. WESTSMITH
N. P. N. News Bureau

LOS ANGELES, Nov. 12. — What does the coming year hold in the way of legislation affecting the California oil industry?

This burning question was paramount in the minds of industry leaders today as they analyzed results of last Tuesday's general election which saw the uninterrupted 44-year reign of republicans in the governor's chair broken by a Progressive Democratic regime offering a "Social New Deal."

In view of past records and public statements of the incoming high officials, competent observers are frankly apprehensive of what the future may hold. A severance tax on oil and minerals, a new program for development of state-owned tidelands, and the defeat of any proposal advocating control of crude production in this state, are among the predictions.

Culbert L. Olson, governor-elect, and Ellis Patterson, new lieutenant governor, will take over the reins next January, just prior to the 1939 meeting of lawmakers in Sacramento.

If the past can be taken as a criterion, numerous and far-reaching measures of vital interest to the oil industry will be proposed.

But unlike the past, the governor's veto power is now expected to line up with a predominently Democratic Assembly and overshadow balancing efforts of the Republican-tinged Senate.

A determined effort to change the California legislative set-up and eliminate the upper house as a minority factor, is seen in a post election utterance by Superior Judge Robert W. Kenny, state senator-elect, in which he pointed to the senate as "reactionary" and advocated its abolition in favor of a unicameral legislature.

This is in line with a proposal by Patterson — now lieutenant governor elect—who as assemblyman in 1937 offered amendments to the state constitution to provide for a single-chamber legislative body.

Both Olson—as senator from Los Angeles — and Patterson were the authors of numerous bills in 1937 which directly affected the oil industry and were designed to broaden state control and to increase state revenue from natural resources.

Olson proposed a measure for development of state owned tidelands in the Huntington Beach field, in which it was declared state oil deposits were being drained by wells on the uplands. Bids were to be asked for the right to drill these lands, with a minimum royalty to the state of 30 per cent of the gross on all wells producing in excess of 200 barrels per day, drilling to be permitted in the tidelands.

This measure passed both houses and was signed by Governor Merriam but was held up by referendum and went down to defeat by the voters last Tuesday, along with the O'Donnell tideland development measure which was similar in many respects to the Olson proposal, but provided for a minimum royalty of 20 per cent.

It will be recalled that last March, at a special legislative session a law was passed for developing the tidelands at Huntington Beach, by drilling from the uplands. This became effective in September and several wells are now being drilled, which will produce a royalty to the state ranging from 12 to 60 per cent.

It is too early to predict whether the 1939 legislative session will modify this law, or provide for development of other tideland properties.

Olson was also author of a proposed amendment to the General Laws, relative to filing of records by oil well operators, in which was authorized the release of such records to state officials, legislative investigating committees and the attorney general at times when the state was taking action for recovery of oil, or for damages resulting when oil was taken from state lands.

Another comprehensive oil measure would have rewritten the State Mineral Lands Leasing Act, particularly the part relating to increase of royalty to the state when such lands were leased to private operators.

The governor-elect, as senator submitted another measure providing that no lease, contract or agreement, relative to the production of oil and gas from state lands by means of wells drilled on privately owned property, should be valid unless authorized by an act of the legislature.

Danger of Severance Tax

Probably the greatest threat to the oil and mineral industries in California, as a result of the change in administration, lies in the direction of a severance tax. During the 1937 legislative session, Patterson proposed a bill in the assembly to levy such a tax on oil and all other natural resources produced in the state, except gold and silver.

The rate of this tax was set at one per cent of the gross market value of the resources affected, and provision was made in the title, but not included in the body of the bill, for the imposition of additional taxes on the processing of these natural resources.

Under the measure, which was tabled in the face of strong opposition, a license would be required to engage in the oil producing business. The tax would be first lien against real and personal property of the producer. In a pre-election statement, Olson answered charges that he favored a severance tax by saying that as governor of the state he would not foster any tax that would destroy California industry, or hamper the ability of California products to compete in world-wide markets.

Furthermore, he said, "I will unalterably oppose any burden of taxes that will lessen the ability of our state to develop its natural resources. A severance tax is not declared for in the Democratic State platform and, therefore, is not an issue in the campaign."

State Development of Oil

Another look at the record, shows lieutenant-governor-elect Patterson was the author of an assembly bill in 1937 which provided that the extraction, or removal of oil and gas from state owned lands by the state constituted a "public use", and gave authority to the director of finance for eminent domain condemnation of necessary property to this end.

The bill further proposed that the state enter the oil industry by authorizing state officials to carry on all development operations needed to develop state owned oil lands. Revenue from the operations was to be placed in an "Oil Production Fund", with proceeds, after expenses, to be appropriated to old age benefits. This measure did not pass in 1937.

Patterson was also the sponsor of a 30-hour week in a bill which would have limited hours of labor for both public and private employment to not more than six hours a day and five days a week. It exempted agricultural, domestic and professional employment.

It is indicated now that one of the first orders of business to come before the 1939 legislative session will be the consideration of an entirely new tax structure for the state.

Oil Proration Is Out

At this time, it is seriously doubted whether a production control law for the oil industry will receive more than passing attention by the 1939 session. Following the abortive industry-attempt to gain support for such a measure last March during the special legislative session, plans were laid to continue the efforts next January.

A poll of all producers in the state last summer showed an overwhelming vote in favor of such legislation, but it is doubted that it would receive favorable handling by the new administration.

Certain groups of independent interests, who have consistently opposed state regulation of crude production, are closer to the new regime and can be expected to have more to say about legislative enactments than in the past — though they were successful in their opposition even then.

Heil Is Elected

CHICAGO, Nov. 14.—An oil equipment manufacturer, Julius P. Heil, of Milwaukee, will raise his hand in the capitol at Madison, Jan. 2 and take the oath as Wisconsin's next governor.

Wisconsin voters last week enthusiastically accepted Heil's application for what he termed "the biggest job in Wisconsin." Heil campaigned on platform of applying business principles to obtain better government at less cost (N.P.N., Nov. 2, p. 28).

Heil, in his first political campaign, scored a smashing victory, rolling up a plurality of 200,000 over governor Phil La-Follette who ran for re-election on the Progressive ticket. The entire Republican state ticket was swept into office in the Heil landslide. Wisconsin voters also sent a Republican senator to Washington, along with eight out of 10 Republican members of the state's congressional delegation.

Manager of Heil's campaign was Roy L. Brecke, Milwaukee, secretary of the Wisconsin Petroleum Association.

Pennsylvania Probe of Oil Seems Doomed

HARRISBURG, Pa., Nov. 14.—Defeat of the Democratic ticket in Pennsylvania at the polls on November 14 is expected to result in a "fold up" for the legislative investigation into the oil industry. Authorized originally by the 1937 legislature, the Supreme Court invalidated the legislative action several months ago.

In his call for the special session of the General Assembly which convened July 25 Governor Earle included the proposal for corrective legislation to overcome Supreme Court objections to the oil probe. The legislation was passed and approved by the governor who in turn re-named the same five members from the 1937 commission.

Since the commission was renamed, however, complications have arisen over the matter of Senate confirmation of the commissioners. Judge Ralph H. Smith, Pittsburgh, chairman, was a candidate for lieutenant governor in the Democratic primary last spring on a ticket which was defeated by the State Administration slate. Because of this there has been opposition to Smith's confirmation.

Senator Edward J. Thompson sponsored a bill in the special session earlier this fall to have the commission consist of five legislators, thereby eliminating the necessity for Senate confirmation. This bill has been passed by the Senate. Thompson served on the 1937 commission and was renamed by the governor this year, but he was defeated for re-election last week.

As a result of the recent election with its defeat of the Democratic candidates any likelihood of state regulation of the oil industry in Pennsylvania seems remote.

U. O. P. Files Suit On Refining Patent

N. P. N. News Bureau

CHICAGO, Nov. 12. — Suit for alleged infringement of cracking patents has been filed by Universal Oil Products Co. against Mid-Continent Petroleum Corp. of Tulsa, in the U. S. District Court in Delaware, according to announcement by U. O. P. Injunction and damages are asked for alleged infringement of seven Universal patents as follows: 1,488,325; 1,546,634; 1,619,977; 1,820,057; 2,070,124; 2,080,118; Reissue No. 19,818.

This is the second suit filed by Universal against the Mid-Continent company. In 1927, Mid-Continent was charged with infringement of five patents of which two are included in the present suit. Mid-Continent subsequently settled this suit out of court, signing a license agreement effective Jan. 1, 1936. Universal filed the present suit on Oct. 14, 1938, after Mid-Continent cancelled the license agreement, the announcement said.

Conoco Will Install New Cracking Plant

TULSA, Nov. 14.—New equipment and improvements to cost approximately $1,500,000 are to be installed at the Ponca City, Okla., refinery of the Continental Oil Co. during the first half of 1938.

The major portion of that amount will be for installation of a Cross thermal process cracking unit, the company having contracted with M. W. Kellogg Co., New York, for this installation, to cost $1,250,000. The new process, licensed by Gasoline Products Co., will increase production of gasoline approximately 10 per cent on refinery throughput.

Conoco will spend an additional $250,000 for rearrangement of the steam and electrical systems, revamping lines, pumping units and remodeling of other equipment to permit continuance of coke production.

The expansion program at the Ponca City plant follows closely completion of one at the Denver, Colo., refinery and other work at the Artesia, N. Mex., and at the Baltimore plants. The Denver program cost approximately $500,000.

The Security Exchange Commission has announced at Washington, meanwhile, that the Continental company has filed with it a registration statement covering the intended issuance of $21,071,600 of 10-year convertible debentures. Net proceeds from sale of the debentures will be used in part to repay all present bank loans amounting to approximately $2,500,000.

The company's statement said its general funds have been and may be used in exploring, buying and developing oil and gas properties, and in improving refineries, transportation and marketing facilities.

While the company's program is understood to have been worked out tentatively, the work at the Ponca City plant is the only portion which has been officially announced.

Little Change—Is View On Southwest's Elections

N. P. N. News Bureau

TULSA, Nov. 14.—Oil men can see, in the wake of the elections last week, few if any political changes of sufficient importance to effect their operations in the Mid-Continent in 1938. Election results in Texas and other traditionally-democratic states merely confirmed the primary choices, as the republican nominees ran far behind.

The two questions in Texas now are:

1. Will Lon A. Smith become chairman of the Texas Railroad Commission in January?

2. How will G. A. Sadler, the new member, line up with the other commissioners?

It has been the custom in Texas to rotate the chairmanship, the member who will be up for re-election next being given that honor. C. V. Terrell was chairman at the time he was defeated by Sadler and he promptly relinquished his task to Col. Ernest O. Thompson for the remainder of his term of office. Col. Thompson still has four years to serve, and unless custom is tossed aside Smith will be the next chairman.

Smith has not seen eye to eye with Thompson and Terrell on many of the regulatory orders, and should Sadler cast his vote with Smith on those issues Thompson naturally would be the minority voice, despite the fact that he has undoubtedly devoted more of his attention to oil than have his colleagues.

Ray O. Weems succeeds Jack Walton on the Oklahoma Corporation Commission, the latter having made an unsuccessful race for another term as governor. The commission accordingly will be made up of Reford Bond, chairman, A. S. J. Shaw and Weems. The major question before oil men accordingly pertained to the post of conservation officer and it generally is believed that W. J. Armstrong, present holder of that position, will be re-appointed.

Kansas Returns To Fold

Republican Payne H. Ratner, attorney and member of the state senate from Parsons, Kan., essentially a railroad town, defeated Democratic incumbent Walter H. Huxman, and will become governor of Kansas in January. He said before election he would "take politics out of the state's proration laws."

The Kansas Corporation Commission's members, however, are appointed for "staggered" terms and their appointments confirmed by the senate.

The commission at present is composed of two Democratic appointees and one Republican. E. R. Sloan, the chairman, is a Democratic appointee of Gov. Huxman. The term of Ernest L. Blincoe, the other Democrat, expires in March, 1939, while Homer Hoch, Republican, was elected to a judgeship and will take office in January.

This accordingly leaves two appointments to be made by the incoming Republican governor. Hoch and Blincoe have been members of the commission since it was created in 1933 when the legislature, after Landon's election, abolished the public service commission and created the corporation body. The new commission, from present indications, accordingly will be relatively young in point of service, since Sloan has served only since March, 1937.

South Dakota Elects Ex-Jobber To Senate

N. P. N. News Bureau

CHICAGO, Nov. 12. — South Dakota has voted to send a former oil jobber, Chan Gurney, to Washington as a senator. Gurney, who ran on the Republican ticket, was president of the Chan Gurney Oil Co. of Sioux Falls, an offshoot of the former House of Gurney Nursery at Yankton. He entered the oil marketing business with the WNAX Service Stations. For a while, Gurney marketed an alky-gas motor fuel. Gurney, now a radio announcer at Yankton, is out of the oil business.

Missouri 'Gas' Tax Increase Is Beaten

ST. LOUIS, Nov. 12.—Petroleum Retailers Assn. of St. Louis and other service station men of Missouri were a large factor in the defeat in Tuesday's elections of proposals to increase the state gasoline tax from two to three cents a gallon. Because of city gasoline taxes, this would have meant a hike of from four to five cents in the tax for St. Louis and other cities.

Crude Price Changes

LOUISVILLE. — Effective Nov. 10 Stoll Oil Refining Co. reduced prices for Stoll Pipe Line oil in Kentucky 10 cents, to new price of $1 per barrel. Last previous change was a 10 cent cut Oct. 12.

Houdry Process Explained For First Time At A. P. I.

N. P. N. News Bureau

CHICAGO, Nov. 15.—Production of 45% yields of 77-81 octane number motor fuel from most any type of charge stock, with gas and gas oil the only by-products and without producing any heavy fuel oil are the high points of the results obtained from the operation of the Houdry process for catalytic cracking, according to advance notices.

Three papers dealing with the Houdry process, the details of which have aroused much curiosity among refiners this year, are to be presented before the American Petroleum Institute's division of refining this week.

This process is credited by technologists as being one of the answers of chemical engineers to the demand for more gasoline and less heavy fuel from refinery operations. Socony-Vacuum Oil Co. is now in the throes of a building program in which $24,000,000 will be invested in Houdry units at its several refineries. Sun Oil Co. is spending $11,000,000 for the same purpose. The process has been used this year to produce 7,000,000 gallons of aviation fuel.

Every hydrocarbon isolated from both the water-white and the solvent extract portions of lubricating oil fractions from Mid-Continent petroleum contains one or more naphthene rings, Dr. F. D. Rossini of the U. S. Bureau of Standards shows in a paper reporting the later results of this Institute project. This fact eliminates the possibility of the presence of any appreciable amount of purely paraffinic or aromatic molecules, Rossini believes.

One major cause of the variation in octane requirements of different makes of cars and even of different individual engines of the same make is the difference in the spark-advance settings for the different cylinders of the same engine, A. J. Blackwood and collaborators of Standard Oil Development Co. announce. These variations are so great in some cases, these researchers report, that the automotive industry is not capitalizing efficiently on the continued developments in fuel anti-knock and other properties made by the refining industry.

They point out that care in assembling cars at the factories will in great measure eliminate these variations, and will permit the use of higher compression ratios and thus higher engine efficiency. Variations in air-fuel ratios reaching different cylinders in the same engine also militates against engine efficiency and lessens the value of the fuel as utilized by the engine.

The control of wax distillate quality occupies most of the time allotted to one session of the group, in which a four-part paper by Continental Oil Co. technologists discuss exhaustively the operating factors which affect the properties of paraffin distillate.

Other papers of considerable interest especially to operating executives and engineers are those on removal of coke from chambers by means of water jets, the coking of heavy fuel oils to produce gasoline, coke and recycle stocks, the recovery of oil from percolation clays, the revivification of spent bauxite, and the comprehensive report of the Institute's Corrosion Prevention Committee on corrosion problems in the refinery.

Roy Fisher Resigns As Member of NOMA

DETROIT, Nov. 15.—Roy R. Fisher, Argo Oil Corp., has resigned as a director and member of National Oil Marketers Assn. He was president of the national jobbers' organization from October, 1937, to October, 1938. In an open letter to Paul E. Hadlick, secretary of the N. O. M. A., Fisher said the association "is not going in the right direction." Text of his resignation letter as released by Fisher, follows:

Mr. Paul E. Hadlick, Secretary
National Oil Marketers Association
National Press building
Washington, D. C.

Dear Paul:

I had hoped I would not have to take the position that I am compelled to in relation to the N. O. M. A.

In order that my act may not be misconstrued, it is necessary for me to relate some of the things that I fought for, and also felt reasonably sure the N. O. M. A. stood for, but very peculiarly, it appears a great deal differently.

Now let's just start from the very beginning of practically all of the difficulties, which seemed to come to a real head with the inception of the Code, and during the Code days. I fought long, hard and diligently, with a view of bringing about some sane and sensible understanding, but was not very successful. Then we started the Michigan Investigation—You will recall that during all these activities I never could reconcile my ideas with those of others who urged criminal proceedings; feeling that these criminal proceedings against the major oil companies and their executives was not the procedure to follow with a view of correcting the difficulties.

I made this statement prior to the Investigation and Grand Jury, and subsequent thereto. "I never was, am not now, nor will I ever be in favor of criminal prosecution." The record, as far as my position is concerned, is both positive and clear, but regardless of my position and regardless of the fact that better judgment dictated a wiser course, viz., that of negotiation, some persisted in the mad desire to put certain persons in jail.

Now comes a year ago last October, when I was elected to the presidency of the N. O. M. A., and upon taking office I tried to take the Association from a course of personal "revenge" to one of conciliation and adjustment, and the very first real intuition I had that the members of the Association, its directors and officers were being used as tools to satisfy a personal idea rather than a material and lasting ideal for the betterment of the jobber, came about in February and March of 1938.

My better judgment suggested that I resign as president and director, but felt that I could still change the course, but I was mistaken.

Then I dropped into this Mexican situation which took me out of the country for quite some time, and I returned in time for the opening of our Convention—my mind full of this business and other ideas. I was wholly unprepared to make any statement due to the fact that my time was all taken up in Mexico, effecting an arrangement which the world already knows about.

However, I did take the opportunity to make some very frank remarks when I presented the gavel to the newly-elected president, and felt fully justified in making these statements, because I felt the jobbers throughout the country were not getting what they should have gotten—and that is reasonable and sensible representation.

Now my feelings in this are prompted by my receiving a copy of the resolutions that were passed on after I left the convention for home, and when I read the resolution pertaining to the Posted Prices, etc., I just simply could not contain my thoughts in regard to the whole situation quite any longer and without a firm decision. It is one thing to attempt to lead and guide people along equitable lines, and it is quite another to lead to destruction via the personal grudge route.

During the opening day, we had a rather frank and open discussion on the subject and from the rostrum I suggested that if the jobbers thought the proper prices were not being posted they could go into the open market, make purchases, and report them to the Reporting Agencies as evidence of what was taking place, and I appointed a sub-committee of the Resolutions Committee to act in this matter and bring about a way in which this could be done—But the minute I left for Detroit, a Resolution was drawn, read and approved, that was as far away from the idea as anything could possibly be; and further, when I was on the rostrum no discussion was had relative to enlisting the aid of the Attorney General or the Department of Justice, to arrive at such a point, so rather than approach an apparently solvable problem by a definite and genuine effort—properly—we resorted to a method that is neither proper nor desirable.

Paul, no one realizes or appreciates the real need of a National Association more than I do, but it must be had along lines that will inure to the benefit of the jobbers as a whole, rather than satisfy personal whims or fancies; and realizing that the N.O.M.A. is not going in the right direction, I have no other alternative but to resign, both as a Director and member thereof.

With my good wishes to you personally, and kindest regards, I am

Sincerely yours,
(Signed)—Roy R. Fisher

ICC Postpones Memphis Hearing

By Teletype
N. P. N. News Bureau

WASHINGTON, Nov. 15. — Interstate Commerce Commission today postponed indefinitely hearing set for Dec. 1, at Memphis on application of railroads to establish new low rates on gasoline and kerosine from New Orleans-Baton Rouge group points to Florence, Decatur, Sheffield and Guntersville, Ala., without corresponding reductions from points west of the Mississippi river to meet barge competition on the Tennessee river.

Hearing on reopened docket 17,000, part 4, to determine if prescribed relationship between rates from NO-BR group points and west-of-river points should be maintained, will go ahead Dec. 1, at Memphis as scheduled.

'Pipelines Losing Money'

More Northern Oil Used and Lower Rates Mean Red Ink for Some Lines, ICC Hears

N. P. N. News Bureau

WASHINGTON, Nov. 12. — Already more than five years old, the crude-oil pipeline rate case probably will drag along at least for another year before it is decided finally by the Interstate Commerce Commission.

This was indicated following conclusion of two days of hearings this week before ICC Commissioner Aitchison, who gave pipeline counsel until Feb. 1 to file briefs. After the briefs are in, Examiner J. Paul Kelley will write another proposed report which probably will precipitate more argument.

So, the fall of 1939 seems a conservative guess as to when the commission may finally rule in this case which began in 1934.

Some of the pipelines at the hearings Nov. 9 and 10 contended that the 35-per cent rate cut recommended by Kelley in his proposed report in 1936 was now moot inasmuch as "voluntary" rate reductions since then had brought their rates down approximately to the level recommended by Kelley. However, they reiterated their opposition to Kelley's recommended cut in minimum tender requirements.

Hearing was also marked by the statement that some pipelines "are losing money now," due, it was said, to reduced rates and decreased movement of crude from the Mid-Continent, plus increased labor and material costs.

The pipeline rate case, first in 20 years before the ICC, arose in 1934 when John E. Shatford, El Dorado, Ark., protested proposed pipeline rate cuts because, he said, they would permit northern refiners to lower their costs and push back into marketing territory of field refiners. The ICC permitted the rate cuts to go into effect, but launched an investigation.

A hearing was held in July, 1935, and Shatford, appearing as a refiner and representative of a holding company owning stock in major oil company and railroads, was the only witness. Aitchison tried, but unsuccessfully, to coax the pipeline representatives to testify.

At another hearing in 1936 — after Kelley had filed a proposed report recommending rates be cut to not over 65 per cent of the Dec. 31, 1933 rate and minimum tenders of not over 10,000 barrels — the pipelines were anxious to testify. Aitchison first took the view that they had passed up their chance but he later reopened the case for further data.

All On Hand

Hearings of the past week were in this reopened proceedings. Representatives of virtually all of the interstate pipelines filled the blue-leather chairs of the ICC hearing room. Aitchison and Kelley had to sit overtime in order to hear all the pipeline witnesses.

Burden of pipeline testimony, offered by a score of witnesses, from pipeline presidents to accountants, was (1) that recent rate reductions have virtually "complied" with the Kelley proposal; (2) that volume of business is falling off, and rate cuts have been made to attract it back, to no avail, and that as a result, some lines would actually show a loss under present rates and present volumes moved; (3) that minimum tenders of larger volume than 10,000 barrels are necessary to prevent contamination, particularly where crudes of varying quality are run; (4) that costs of labor, taxes, materials and all other necessities are up now, and must be met, and that (5) because of these facts there was no need for an ICC order reducing either rates or minimum tenders.

'Rates Lower Than Rail'

One of the exhibits presented was a tabulation prepared by Edward B. Sheffe, assistant traffic manager for Standard Oil Co. of New Jersey, comparing trunk pipeline rates with rail rates for transportation of crude between the same points. According to the exhibit, the pipeline rates are from 8 to 80 per cent lower than rail rates, with the general average is about 35.72 per cent lower.

D. S. Bushnell, president of Buckeye Pipe Line Co., Indiana Pipe Line Co., Northern Pipe Line Co. and New York Transit Co., occupied the stand probably longer than any other witness, contending that large-volume minimum tenders to prevent contamination between successive batches of crude. Differences in operating methods and facilities was another reason cited for varying minimum tender rules.

Bushnell pointed out that his lines in some cases — where only one grade of crude is run through one line — accept tenders as small as 1000 barrels.

Sweet And Sour Crude

He also offered as an exhibit a collection of some of the minimum tender rules of the various pipelines of the country, explaining, at request of Aitchison, their differences. Difference between "sweet" and "sour" crudes and other distinctions as to quality, were also explained by Bushnell and, like several witnesses who followed him, he said that the extent of contamination in the line increases with the distance the oil is transported.

Bushnell said the only way in which a 10,000-barrel minimum tender would be feasible was under a tariff rule allowing the oil covered by it to be mixed with the "common stock" of that grade of oil in the line. Where different qualities of crude are being shipped on successive tenders, however, a batch of 10,000 barrels would be "ruined" under some conditions, he said. Other witnesses dwelt on this point, also. One of them, O. Q. Lomax, assistant general superintendent of the Humble Pipe Line Co., explained operating problems peculiar to the Southwest to the commissioner and examiner.

N. V. Truly, Comptroller of the Humble Pipe Line Co., said that his company's rates today are 36.72 per cent less than on Dec. 31, 1933, and, like several other witnesses, referred to increasing labor costs, costs of material and other capital outlays. Aitchison then asked that all the companies submit figures showing just how much these costs had increased.

Pipeline Hours Cut, Wages Up

Truly read into the record figures showing how the workweek for common labor had been shortened from 70 to 36 hours since 1928, while wages had been increased from 50 cents to 88 cents per hour during the same period.

R. B. McLaughlin, secretary and treasurer of the Texas Pipe Line Co., and affiliates, said, like several other witnesses, that whenever his companies had had sufficient business to warrant it, "we have passed it on to the shipper" in reduced rates.

Aitchison brought out, however, in questioning, that the pipeline shippers were generally oil companies who themselves have some interest in the pipelines.

Aitchison asked many of the witnesses why their companies had made the recent rate cuts, and was told, in most instances, that it was because they were losing business, due chiefly to development of new production in Illinois and Western Kentucky.

'Pipeline Loses Money'

W. R. Finney, president of Oklahoma Pipe Line Co., who appeared also for the pipe line division of the Louisiana Standard, said that if the development in Illinois and Kentucky continues "we face a complete shutdown."

Finney said the Oklahoma

Texas Studies Plan To Check On Refineries

N. P. N. News Bureau

TULSA, Nov. 14. — Operation of refineries and natural gasoline plants in Texas will be studied by the Texas Railroad Commission at its monthly proration hearing at Austin, Nov. 18, in view of plans now under way to seek amendment of the present conservation laws when the legislature meets next January.

The commission has announced it will seek data and testimony which will be made available to the legislature when it considers the proposal to bring refineries and natural gasoline plants within the regulatory powers of the commission. The present law prohibits the commission from exercising any regulation over that part of the industry in Texas.

The commission has announced it will consider:

1. Possibility of refiners and natural gasoline manufacturers making accurate reports and the commission making accurate check on operations with equipment now installed.

2. Advisability of installing additional tanks for measuring all crude oil and other products taken into refineries and all finished products of the plants.

3. Possibility of installing additional meters to determine gas volume taken into natural gasoline plants and residue volume of gas leaving plant; also advisability of installing additional tanks for measuring gasoline manufactured at the plants.

line and its connection, the Ajax, were running 60,000 barrels a day last year, but that at the present time, and with reduced rates, they were running about 15,000. At this rate, he said, both are losing money.

On the basis of present runs and present rates, Finney said, the Oklahoma company would lose about $650,000 a year.

S. D. Kane, assistant treasurer of Ajax Pipe Line Corp., presented testimony along the same lines, and discussed also division of joint rates among connecting carriers.

Other witnesses who appeared during the two-day session included C. H. Gompf, treasurer of the Illinois Pipe Line Co.; J. A. Neath, Humble Pipe Line Co.; A. H. Weisgerber, Standard Oil Co. of New Jersey accountant; J. L. Schuemacher, auditor with Stanolind Pipe Line Co., and several other pipeline representatives.

At the close of the hearings, Aitchison pointed out to the pipeline attorneys and officials that the 15 completed final valuations of pipeline properties made by ICC's valuation bureau pursuant to valuation orders of 1934 were *prima facie* evidence of the value of the properties of those companies, and would be so considered in drafting a report in this case.

He also pointed out that tentative valuation proceedings are under way for about 40 other companies, and, while these are only tentative, "they will be helpful".

J. V. Norman, who had acted as chairman of the "committee of counsel" during the hearing, said he could see no objection to their consideration in connection with the case, but said there should be some understanding as to the "weight" to be given the valuations.

Norman then suggested that he would like a proposed report before final action by the commission, and Aitchison delegated Kelley to write the report.

Aitchison would give no definite answer to Norman's further suggestion that another hearing in the case somewhere in the oil fields would be "very desirable". The attorney said such a hearing would give the commissioner an opportunity to see first hand the "actual operation", and it would "give you a better idea of this minimum tender proposition."

"We'll see what we can do," Aitchison replied, but set Feb. 1 as a date for filing of briefs without setting a date for further hearings.

Interstate Commerce Commission was represented at the counsel table during the hearings by Attorney B. L. Smelker, of its Bureau of Inquiry.

Thompson Asks U.S. Buy Crude for War

BULLETIN

AUSTIN, Texas, Nov. 15. — Col. Thompson indicated today, on basis of replies from crude buyers, that market may be found for some 560 "orphaned" wells. Some pledges to furnish connections were contingent on continuance of weekly two-day production holiday.

TULSA, Nov. 12.—Col. Ernest O. Thompson, ever a salesman of things pertaining to Texas, took his sample case in hand again last week and went out looking for customers. His bill of goods this time was petroleum.

First, he solicited 13 major buyers to help the owners of wells in East Texas that have no market outlet. He said there were 500 such wells. (At the end of this week the number had been reduced to 419, according to one count; earlier, it was 540.)

Next, the colonel, who is chairman of the Texas Railroad Commission and of the Interstate Oil Compact Commission, wrote to Louis A. Johnson, assistant secretary of war, who is chairman of the National Defense Power Committee and who is beginning a survey of U. S. industry and its readiness to buttress the national defense.

He told Johnson that the U. S. has adequate oil reserves for any emergency and suggested that this might be a good time for the War Department to buy crude oil.

"There are at this time some 500 wells in Texas without a pipeline connection," Col. Thompson wrote. "No one seems to be willing to buy this oil. I am wondering if the War Department would not be interested in buying the production from these wells. There has been a recent cut in the price from $1.35 to $1.10 a barrel and, therefore, I believe this would be a good opportunity for the government to buy good crude at an advantageous price. The pipelines of Texas are common carriers and are under the direction of the Railroad Commission, so there would be no trouble in getting this oil to tidewater."

"Foreign" crude oil — from Louisiana and Arkansas—continues to come into the East Texas field for refining at prices under the East Texas oil. This contributes to the restriction in East Texas market and major buyers have been reluctant to take on additional connections for the winter season above the new wells on properties where they attempt to take care of all the allowable production.

Texas Proration Attacked

Attack on the East Texas method of proration, filed in federal court early in September, has been set for trial in San Antonio, Dec. 2. The suit was brought by Rowan & Nichols Oil Co. It goes to the heart of a long standing controversy between a number of operators in the field and the Railroad Commission. East Texas wells are prorated on straight potential production basis; Rowan & Nichols company contends that the acreage, sand thickness and other factors affecting recoverable reserves should be considered in fixing allowables.

Victory by the plaintiffs would call for fundamental changes in the proration system which has been in effect since early in 1933.

The case will be heard by U. S. Circuit Judge Joseph C. Hutcheson and District Judges T. M. Kennerly, Houston and R. J. McMillan, San Antonio.

In Kansas, the Corporation Commission postponed to Nov. 28 the application made by Montgomery county producers for order against the cessation of purchases from certain stripper well properties. Sinclair Prairie Oil Marketing Co. has been the buyer and the complaint alleged that the company was planning to withdraw from certain pools, leaving them without market outlet. The commission had set the hearing for Nov. 11. The legal question involved—the authority of the commission to compel purchasers to keep on buying—is without precedent in Kansas.

Osages Reject Plan

Formal rejection by stripper well operators in eastern Osage county and Tulsa county whose properties have been served by Barnsdall Oil Co. of the storage-transportation plan offered by Barnsdall Refining Corp. has left about 4000 barrels daily with no prospect for immediate outlet. Barnsdall Oil withdrew as a buyer on Oct. 15; Barnsdall Refining offered to become the purchaser at price lower than the prevailing scale for oil in this area. That plan, accepted by the producers, was rejected by the Osage Tribal Council. Barnsdall Refining then offered to move the production to storage, buy it when refinery realizations made it possible to resume plant operation on "break-even" basis. Pipeline charge proposed was 12 cents per barrel, storage one cent per barrel monthly.

Authority Lacking for Total Shutdown In Oil States, I.P.A.A. Group Finds

N. P. N. News Bureau

TULSA, Nov. 14.—Definite action was taken on two of the various issues laid before it when the Special Study Committee of 36 of the Independent Petroleum Assn. of America met for the first time Nov. 11, at Fort Worth, Tex. The other issues were referred to subcommittees named to study them.

The committee decided:

1. That no authority existed for calling for a total shutdown in all oil producing states having oil regulatory bodies and that such action would be impractical.

2. That the association's action regarding imports, taken at the annual meeting in Tulsa in October, be re-affirmed. The membership at that time decided to request an increase in the federal excise taxes on imported oil, the restriction of imports to a ratio of 4.5 per cent of total consumptive demand and the taxation of crude petroleum and its products used as supplies for vessels. It had been proposed that all imports be barred for a time.

Other issues which had been referred to the committee were those relating to pipe line divorcement, complete disintegration of integrated companies, an umpire to make allocations that are enforcible, through amendment of the Connally "hot" oil law, between oil producing states and the proposal for refinery regulation through the Interstate Oil Compact.

Divorcement Studied

A sub-committee of 11 was named to study further the question of pipe line divorcement, a sub-committee of seven to study the allocations-umpire proposal, and a sub-committee of seven to study the refinery control proposal. These subcommittees were requested to be prepared to report Dec. 10 to the entire study committee, when it meets again at Fort Worth.

Following are the personnels of the three sub-committees:

Pipe line divorcement—Frank

Buttram, chairman, Oklahoma City; J. E. Farrell, Fort Worth, Tex.; J. S. Bridwell, Wichita Falls, Tex.; Stan S. Welch, Artesia, N. M.; Winston P. Henry, Houston; E. C. Morarity, Wichita, Kan.; George A. Hill, Jr., Houston; E. B. Reeser, Tulsa; Alf Landon, Topeka, Kan.; C. A. Lester, Dallas and Joe K. Mahoney, El Dorado, Ark.

Allocations umpire—J. C. Hunter, chairman, Abilene; Amos L. Beaty, New York; R. H. Foster, Fort Worth; Jake L. Hamon, Dallas; K. S. Adams, Bartlesville, Okla.; J. A. Aylward, Wichita and Arthur H. Seeligson, San Antonio.

Refinery control through interstate oil compact—W. G. Skelly, chairman, Tulsa; Al Buchanan, San Antonio; L. H. Prichard, Oklahoma City; C. A. Smith Jr., Saginaw, Mich.; S. A. Guiberson Jr., Dallas; E. B. Shawver, Wichita, Kan., and Capt. B. A. Hardey, Shreveport.

The sub-committees will meet on call of the chairmen.

There were 26 members of the special study committee present at the Fort Worth meeting, which was closed to the public and press.

GMC Will Contest Government's Suit In Finance Cases

N. P. N. News Bureau

WASHINGTON, Nov. 14. — General Motors Corp. may be "taking the rap" for the automobile industry generally in its refusal to enter into a consent decree with the anti-trust division as to its auto-financing practices.

GMC's two major competitors, Ford and Chrysler, and their affiliated finance companies, have entered into consent decrees with the government to cease certain practices, most of them halted long ago anyway, but with the stipulation that, should the government's promised "vigorous prosecution" of GMC prove unsuccessful, the two companies entering the decrees will not be discriminated against.

Thus, if GMC is successful in defending its practices against government prosecution, it is to be assumed that all three companies will be again on an equal footing as to resumption of former financing practices.

Outstanding portion of the consent decree, probably because it gave Anti-Trust Chief Arnold an opportunity to open up verbal artillery against competitive advertising generally, was the agreement by Ford and Chrysler not to advertise any one finance company in connection with installment sales of their products, although they are left free to advertise the practice of installment purchase.

Although the Arnold statement announcing the decree made it appear that the finance companies had also agreed against competitive advertising, examination of the facts in the case showed it did not go to such lengths, and justice department officials said it admitted that there was no law banning such advertising.

The advertising restriction was placed on the two companies, Arnold explained, because "monopoly is fostered when advertising is used to put competitors at a disadvantage for the sole reason that they do not have resources sufficient to expend equally large sums in advertising particular products or the services of particular companies." (In this instance, the advertising of their affiliated finance companies by the automobile companies).

By virtue of the agreement, Arnold goes on, "the advertising money of these corporations will not be spent to advance the particular interests of the finance companies to which they are attached; it will be used only to sell the public the plan of financing."

Independent finance companies are not bound by the advertising provisions of the decrees, thus, as Arnold explains, "they may have all of the advantages without incurring any of the burdens."

Aside from the advertising agreement, details of the decrees provided (1) acceptance of no wage assignments on cars of less than $1,000 for noncommercial use; (2) wages or salaries will not be garnisheed with respect to these cars; (3) deficiency judgments will not be taken in the case of any retail purchaser for private use who has paid 50 per cent of the price; (4) no higher rate of interest for extension of time or for rewriting than as provided in original contract; (5) no greater rate than 5 per cent will be charged on delinquent installments, and (6) the finance company will not accept from any dealer the assignment of any chattel mortgages on property other than the car itself.

Mid-Continent Oil & Gas Assn. Will Discuss Taxation

N. P. N. News Bureau

TULSA, Nov. 14. — Federal, state and local taxation will be discussed at a joint meeting of the Mid-Continent Oil & Gas Assn.'s standing committees on state and local taxation and on federal income and excise taxation, to be held Dec. 1 and 2 at the Baker hotel, Dallas.

'Gas' Demand Up 4% Is 1939 Prediction

N. P. N. News Bureau

CHICAGO, Nov. 14. — First published estimates as to demand in 1939 for gasoline and for heating oil were presented here, in connection with the annual meeting of the American Petroleum Institute, by the institute's department of statistics.

On the basis of the present outlook for improved business conditions, an increase of approximately four per cent in domestic gasoline demand in the coming year is anticipated.

This demand would call for around 80,000,000 barrels of gasoline stocks, finished and unfinished, on March 31, 1939, to meet minimum economic requirements. Present actual inventories of around 68,000,000 barrels are about the same as a year ago. Gasoline stocks on Mach 31, 1938, were more than 92,000,000 barrels.

Demand for heating oil for the period from Oct. 1 through March 31, will be about 72,450,000 barrels, the institute estimates, if the coming heating season is representative of the average of the past five. This will be an increase of 15 per cent over consumption in this period in the year previous.

In building up its estimate of an increase of four per cent in the total 1939 domestic demand for gasoline, the institute's statistical department estimated that per vehicle consumption of motor fuel would increase three per cent as compared with 1938.

Effect of Mild Winter

Commenting on the relationship of heating oil demand to gasoline demand, the institute's forecast stated that a mild, open winter would see a less-than-normal furnace oil demand in relation to the number of burners in use and that, in this event, gasoline demand would be above normal expectations and that probably no crude oil would be run to refinery stills primarily to make furnace oils.

While the institute estimate said nothing on this point, it may be inferred that it is still felt that the manufacture of heating oil to meet the demands of a cold winter, which also means less gasoline consumption as motor fuel, would lead to the piling up of gasoline stocks, which last winter added to the refiners' burdens.

The institute estimates that, on Jan. 1, 1939, about 26,850,000 motor vehicles will have been carried over from 1938. If 3,000,000 new vehicles are sold during next year, which it is said seems consistent with the indicated business progress, the institute believes that there will be in use at the end of 1939 approximately 27,850,000 units, after allowing for cars to be scrapped or replaced.

"This would indicate an average of 27,350,000 units in use during the year," the institute stated, "which is an increase of 1.2 per cent over the number in use on the average in 1938. That percentage figure might represent the expected increase in the domestic demand for gasoline if each vehicle in use in 1939 consumed the same number of gallons of fuel as each will have consumed during 1938.

"However, the general expectancy is toward greater business activity next year and past experience indicates that, during periods of sustained business improvement, there is a coincident increase in gasoline consumption per vehicle. It is present expressed opinion that increased employe compensations and national income generally resulting from improved industrial activity will effect an increase in the per-vehicle consumption of perhaps three per cent.

"Recognizing that motor vehicle consumption of gasoline accounts for slightly less than 90 per cent consumption of motor fuel, and attempting to relate all of the foregoing to the total domestic demand for gasoline, is it not reasonable now to expect an increase of approximately four per cent during next year?"

In making its estimate of heating oil demand during the coming winter season, the institute said that the number of home-heating burners in use had almost doubled during the past five years and that indications are the present winter will probably record an average of 1,690,000 as compared with 1,550,000 burners used in heating homes last winter.

"Should the forthcoming heating season be representative of the average of the last five years," the A.P.I. stated, "it appears reasonable to estimate that approximately 15 per cent more furnace oils will be used in heating homes than the 63,000,000 barrels consumed a year ago."

Bad Weather In September Cuts Down Gasoline Demand

N. P. N. News Bureau

WASHINGTON, Nov. 14. — Poor weather in many important gasoline consuming areas during September was chiefly responsible for a drop in domestic demand for motor fuel during that month to a level three per cent below September 1937, Bureau of Mines said in making public its monthly report for September. Report showed September domestic demand at 46,058,000 barrels, compared with 47,515,000 barrels in September a year ago.

"On the other hand," the Bureau predicted optimistically, "the generally fair weather and business upturn of October should compensate September's deficiency in demand."

The decline in gasoline demand during September brought the 1938 nine-month total for domestic demand for gasoline to 388,745,000 barrels, which was 0.8 per cent below last year's nine-month demand figure of 391,723,000 barrels, the Bureau pointed out.

Gasoline exports held a slight lead for the nine-month period, as compared with 1937.

Crude oil production in September showed a material decline, both under August and under September a year ago. Daily average production in September was 3,288,700 barrels, 136,000 barrels below the August level and 380,000 under last September's average.

Decreased crude production was due primarily to Texas, which had in force both Saturday and Sunday shutdowns during September, as compared with Saturdays only during August. Daily average production in Texas dropped from 1,412,200 barrels in August to 1,261,000 barrels in September.

Remainder of the producing states showed a slight gain in September, although there were slight declines in California, Oklahoma and Kansas.

Most notable of the increases was in Illinois, where daily output jumped from 66,500 barrels in August to 85,100 barrels in September (including the new fields as well as settled production).

There were 194 oil wells completed in Illinois during September, which was more than the combined total for California and Oklahoma. Total well completions in U. S. in September showed a decline as compared with the same month of 1937; of the total completed in September this year, 1601 were oil, 160 gas, and 547 dry holes.

Larger yields of gasoline, gas oil and distillates, and residual fuel oil were obtained in September, primarily, the Bureau says, because of heavy reruns, but partly because of declines in production of most of the minor products. The gasoline yield was 45.3 per cent, highest since July 1935.

The higher yield and lower demand for motor fuel resulted in a smaller reduction of gasoline stocks than was expected, total stocks on Sept. 30, 69,086,000 barrels, being only about 1,900,000 below stocks the first of September, and about 3,700,000 barrels above the level of Sept. 30, 1937.

The accompanying table gives comparative figures for both September and for the nine-month periods of 1937 and 1938.

Petroleum Supply and Demand Statistics for Nine Months of 1938 As Compiled by U. S. Bureau of Mines

(Figures in Thousands of Barrels)

New Supply:	Sept. 1938	Aug. 1938	Sept. 1937 (1)	Nine Months Ending With Sept. 1938	Nine Months Ending With Sept. 1937 (1)
Domestic production:					
Crude petroleum	98,661	106,165	110,052	910,570	956,833
Daily average	3,289	3,425	3,668	3,335	3,505
Natural gasoline	4,081	4,226	4,324	37,353	36,079
Benzol (2)	144	133	257	1,163	2,232
Total production	102,886	110,524	114,633	949,086	995,144
Daily average	3,430	3,565	3,821	3,477	3,645
Imports (3):					
Crude petroleum:					
Receipts in bond	159	192	187	2,116	1,482
Receipts for domestic use	1,415	1,522	2,164	16,384	18,750
Refined products:					
Receipts in bond	2,041	1,724	2,463	15,089	17,668
Receipts for domestic use	635	1,229	434	5,729	5,958
Total new supply, all oils	107,136	115,191	119,881	988,404	1,039,002
Daily average	3,571	3,716	3,996	3,621	3,806
Increase in stocks, all oils	3,305 (4)	4,711 (4)	238	11,968	41,313
Demand:					
Total demand	110,441	119,902	119,643	976,436	997,689
Daily average	3,681	3,868	3,988	3,577	3,655
Exports (3):					
Crude petroleum	5,577	7,003	6,602	60,007	48,833
Refined products	9,487	10,763	10,349	87,547	79,296
Domestic demand:					
Motor fuel	46,058	50,459	47,515	388,745	391,723
Kerosine	4,187	4,292	4,397	38,985	37,862
Gas oil and distillate fuels	8,627	7,737	8,672	79,347	79,435
Residual fuel oils	23,082	23,775	26,408	209,576	244,759
Lubricants	2,127	2,002	1,968	15,877	17,763
Wax	69	81	84	790	821
Coke	636	473	586	4,121	4,206
Asphalt	3,017	3,201	2,913	18,953	17,417
Road oil	1,098	1,581	974	6,673	6,915
Still gas	5,287	5,753	5,574	47,038	48,610
Miscellaneous	131	158	218	1,338	1,756
Losses	1,058	2,624	3,383	17,439	18,293
Total domestic demand	95,377	102,136	102,692	828,882	869,560
Daily average	3,179	3,295	3,423	3,036	3,185
Stocks:					
Crude petroleum:					
Refinable in U. S.	282,136	285,640	310,271	282,136	310,271
Heavy in California	17,535	17,575	(5)	17,535	(5)
Natural gasoline	8,159	8,022	6,278	8,159	6,278
Refined products	268,124	268,022	243,993	268,124	243,993
Total, all oils	575,954	579,259	560,542	575,954	560,542
Days' supply	156	150	141	161	153

(1) Final figures. (2) From Coal Economics Division. (3) Imports of crude as reported to Bureau of Mines. All other imports and exports from Bureau of Foreign and Domestic Commerce. (4) Decrease. (5) Not available.

'Gas' Stocks Show Decline

N. P. N. News Bureau

NEW YORK, Nov. 15. — A contra-seasonal decline of 685,000 barrels in U. S. gasoline stocks in the week ended Nov. 12 was reported by the American Petroleum Institute today, despite an increase of 181,000 barrels in gasoline production and a 20,000-barrel increase in refinery crude runs.

Last week's decline in gasoline inventories compares with an increase of 604,000 barrels reported by the Institute in the comparable seven-day period of 1937. Last year, stocks had been on the increase since the first of October. Inventories on Nov. 12 this year totaled 67,551,000 barrels, 1,522,000 barrels below inventories on the same 1937 date.

Inventories of gas oils and distillates increased 156,000 barrels while residual fuels declined 66,000 barrels, with stocks of all oils reaching a new high of 154,666,000 barrels on Nov. 12.

See next page for detailed figures.

Crude Stocks Drop

N. P. N. News Bureau

WASHINGTON, Nov. 14. — Stocks of crude petroleum stood at 275,824,000 barrels on Oct. 29, having dropped 828,000 barrels during the week, Bureau of Mines reports.

At this time last year, stocks totaled 307,140,000 barrels.

Stocks by grade or origin are shown on opposite page.

Penn Lube Stocks Up

N. P. N. News Bureau

CLEVELAND, Nov. 15.—The National Petroleum Association today reported sizable inventory increases for most Pennsylvania lubricating oil items during the seven-day period ended Nov. 10.

Stocks of 142-180 viscosity neutral oils declined 405,111 gallons and inventories of dark cylinder stocks classed as "Other Steam Refined" were down 481,073 gallons. Stocks of all other items increased.

Bright stock inventories rose 595,082 gallons and 600 steam refined inventories increased 259,861 gallons. Inventories of the 180 viscosity and above neutral oils increased 196,479 gallons.

Comparison of inventories as compiled by the N.P.A. from reports of all companies which refined Pennsylvania crude oil is shown in a box on the next page.

Latest Oil Industry Statistics

Trends of Basic Figures

	Nov. 12	Nov. 5	Nov. 12 '37
Crude Production ..... (Bbls. daily)	3,243,250	3,628,550	3,541,450
Crude Imports ..... (Bbls. daily)	97,570	91,285	59,857
Crude Runs to Stills.... (Bbls. daily)	3,180,000	3,160,000	3,321,000
Gasoline Stocks ..... (Bbls. total)	67,551,000	68,236,000	69,073,000
Gas and Fuel Oil Stocks. (Bbls. total)	154,666,000	154,576,000	120,201,000

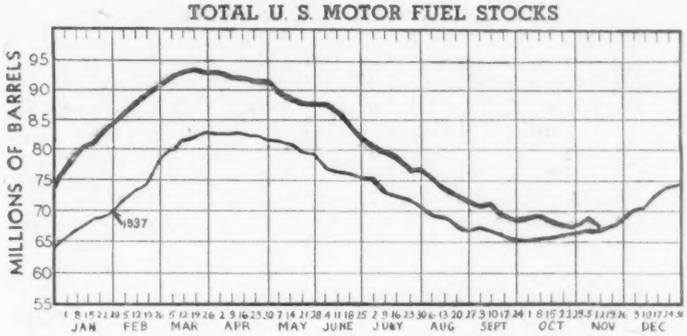
Crude Oil Production for the U. S.

(American Petroleum Institute figures)

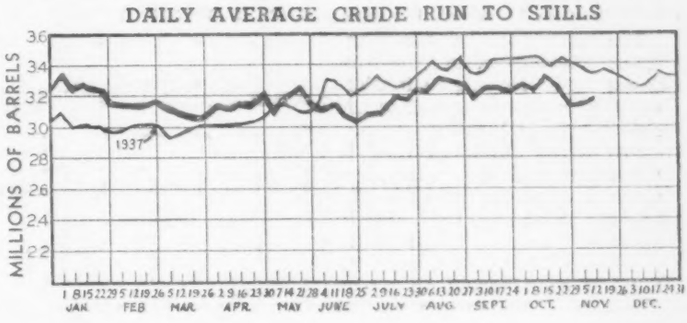
	Week Ended Nov. 12 Barrels	Nov. 5 Barrels	Oct. 29 Barrels
Oklahoma City	105,250	88,100	85,450
Total Oklahoma	450,700	437,000	432,000
Kansas	148,100	144,600	157,100
East Texas	370,400	518,450	370,050
Total Texas	1,255,200	1,655,100	1,260,650
Total Louisiana	260,750	268,400	269,650
Illinois (new pools)	75,300	87,200	77,150
California	674,300	656,100	659,000
East of Rockies	2,568,950	2,972,450	2,578,550
Total U. S.	3,243,250	3,628,550	3,237,550
Crude Imports	97,570	91,280	68,000
Total New Supply	3,340,720	3,719,830	3,305,550

Current Refinery Operations

TOTAL U. S. MOTOR FUEL STOCKS



DAILY AVERAGE CRUDE RUN TO STILLS



A. P. I. Weekly Refinery Report

(Figures in Thousands of Barrels of 42 Gallons Each)

Districts	Per Cent Capacity Reporting	Daily Average Crude to Stills Week Ended		Per Cent of Reporting Capacity Operated Week Ended		(a) Gasoline Production Week Ended		Stocks Total Finished and Unfinished Motor Fuel(b) Week Ended		Stocks of Gas and Fuel Oil Gas Oil and Distillates Week Ended		Residual Fuel Oil Week Ended		Total Week Ended	
		Nov. 12	Nov. 5	Nov. 12	Nov. 5	Nov. 12	Nov. 5	Nov. 12	Nov. 5	Nov. 12	Nov. 5	Nov. 12	Nov. 5	Nov. 12	Nov. 5
East Coast	100.0	497	472	80.8	76.7	1,487	1,277	16,934	17,375	8,134	8,163	8,712	8,726	18,846	16,889
Appalachian	85.9	104	94	81.3	73.4	362	345	2,860	2,885	281	278	542	563	823	841
Ind., Ill., Ky.	89.5	462	462	89.9	89.9	1,955	1,842	10,245	10,189	4,051	4,018	5,163	5,323	9,214	9,341
Okla., Kans., Mo.	81.6	241	230	70.5	67.3	(c)887	(c)869	6,126	6,450	1,358	1,371	3,336	3,375	4,694	4,746
Inland Texas	50.3	118	106	74.2	66.7	488	489	1,637	1,564	417	414	1,574	1,601	1,991	2,015
Texas Gulf	88.9	727	764	86.8	91.2	2,249	2,477	9,415	9,892	6,560	6,521	8,268	8,335	14,828	14,856
La. Gulf	97.3	125	132	86.2	91.0	375	314	1,983	2,084	1,038	1,127	1,849	1,768	2,887	2,895
No. La., Ark.	55.0	51	47	92.7	85.5	128	118	470	456	267	253	612	605	879	858
Rocky Mt.	54.2	40	40	62.5	62.5	219	212	1,075	1,059	131	132	657	651	788	783
California	90.0	483	480	64.8	64.4	1,526	1,552	13,176	12,702	11,108	10,917	87,188	87,018	98,296	97,935
Total Reporting	85.6	2,848	2,827	79.0	78.4	9,676	9,495	63,921	64,656	33,345	33,194	117,901	117,965	151,246	151,159
U. S. Total (d)		3,180	3,160					67,551	68,236	34,175	34,019	120,491	120,557	154,666	154,576
U. S. Total, 11-12-37 (d)		3,321						69,073		27,602		92,599		120,201	

(a) Includes straight-run, cracked, and natural blended.
(b) Includes stocks at refineries, in bulk terminals, pipe lines and in transit.
(c) 12% of reporting capacity in this district did notreport gasoline production.
(d) Estimated, U. S. Bureau of Mines basis.

Inventories of Pennsylvania Lubricating Oils

	Nov. 3, 1938 Gallons	Nov. 10, 1938 Gallons	Nov. 11, 1937 Gallons
1. Raw Long Residuum			
NPN 6-pt	11-15		DALE
(Including all raw long residuum below, and not salable, as 600 fire)	1,780,390	1,902,420	963,651
2. Steam Refined (Includes all steam refined stock commonly sold or used as 600 and as raw material for bright stocks)	9.040,396	9,300,257	9,457,195
3. Other Steam Refined (Not included in 1 and 2 above)	6,651,465	6,170,392	5,277,869
4. Finished Dewaxed Long Res.	2,574,472	2,618,771	2,974,682
5. Bright Stock (Does not include any material reported in 4, above)	14,648,082	15,243,164	14,452,411
6. Viscous Neutral, below 180 vis. but not below 142 vis. @ 100	4,283,428	3,787,317	7,636,024
7. Viscous Neutral, 180 vis. @ 100 and above	7,129,534	7,326,013	7,752,833

Weekly Changes in Crude Oil Stocks*

Grade or Origin	Oct. 15	Oct. 22	Oct. 29	Chg. from Oct. 22
Pennsylvania grade	6,188	6,204	6,167	— 37
Other Appalachian	1,347	1,327	1,314	— 13
Lima-Michigan	1,205	1,179	1,185	+ 6
Illinois-S. W. Indiana	11,227	11,098	11,111	+ 13
Arkansas	2,977	2,974	3,000	+ 26
Kansas	6,128	6,251	6,236	— 15
Louisiana	14,625	14,959	14,465	—494
Northern	5,939	5,854	5,803	— 51
Gulf Coast	8,686	9,105	8,662	—443
New Mexico	7,267	7,420	7,566	+146
Oklahoma	76,352	75,907	75,335	—572
Texas	92,145	91,335	91,163	—172
East Texas	21,010	20,705	20,614	— 91
West Texas	17,499	17,484	17,272	—212
Gulf Coast	19,594	19,166	19,304	+138
Other Texas	34,042	33,980	33,973	— 7
Rocky Mountain	21,323	21,330	21,205	—125
California	33,796	34,138	34,774	+636
Foreign	2,421	2,530	2,303	—227
Total U. S. refinable	277,001	276,652	275,824	—828
Heavy in California	17,249	17,233	17,351	+118

*Compiled by U. S. Bureau of Mines.
(Figures in Thousands of Barrels)

Wage-Hour Division Rules On Wholesalers Under Law

N. P. N. News Bureau

WASHINGTON, Nov. 14.—"Wholesalers"—a term which includes oil jobbers—are subject to the provisions of the wage-hour law even if all the sales which they make to retail customers are within the state where their business is located, according to a letter whose contents have been made public by American Trade Association Executives.

The letter itself, and its recipient, were not disclosed by A.T.A.E., but the description of its contents in the association's current news bulletin gives the gist of the Wage-Hour Division's ruling. At the Wage-Hour Division, it was said that the letter was by this time no doubt buried in its files.

The following quotation is from the A. T. A. E. bulletin, summarizing the Wage-Hour Division's letter on wholesalers:

"In answering questions with respect to the status of a wholesaler making all his sales within the state in which his place of business is located, the Wage-Hour Division points out that there are varying situations even within a group of wholesalers selling locally.

"At times shipment may be made direct to the customer of the wholesaler from the city of the manufacturer. Again, shipment may be made to the wholesaler after the goods have already been resold to or ordered by the customer. The Wage-Hour Division expresses the opinion that any employe engaged in connection with such sales would seem to be 'in commerce.'

"The Division also points out that there may be employes whose sole work is connected with goods which have tentatively come to rest in the wholesaler's place of business. Inquirers are warned, however, that even here the courts may hold that employes employed in connection with the sale of goods brought in from outside the state are engaged 'in commerce.' In connection with such employes the Division suggests it would seem wisest to adopt the policy 'when in doubt, comply.'"

At the same time, in a letter to the Millers' National Federation, the Wage-Hour Division has expressed the opinion that employes of a manufacturer whose products are sold wholly within the state of manufacture are not subject to the act's provisions, "even though raw materials are brought in from outside the state." Exceptions to this ruling, the Division noted, probably would be employes "engaged in purchasing raw materials from outside the state, or in receiving or unpacking the goods."

While these two opinions appear to be at variance, they are apparently both based on the "stream of commerce" theory, which holds that a change in the form of a product, such as would be accomplished by manufacture, takes it from the "stream," whereas the "passing along" of products by the wholesaler from the out-of-state manufacturer to the retailer is a part of the stream.

Nebraska Marketers Convention Program Lists Retailer Day

LINCOLN, Nebr., Nov. 14. — A special day for retailers will be included in this year's annual convention of Nebraska Petroleum Marketers, Inc., Dec. 6, 7 and 8 at Hotel Fontenelle in Omaha.

M. E. Holland, of Racine, Wis., vice-president of the National Association of Petroleum Retailers has been scheduled as one of the convention speakers.

The Nebraska convention will have a trade exhibit, a banquet and dance, entertainment for the ladies, and election of officers.

Other speakers announced by Frank S. Henline, secretary, for the annual meeting in addition to Holland, were:

Gen. Baird H. Markham, of New York, director of the American Petroleum Industries Committee, on taxation and legislation.

C. R. Sullivan, of Wichita, manager of the Independent Refiners Service Corp., on "The Story of Balanced Selling."

W. E. Thomas, of Denver, Navy Gas & Supply Co. and chairman of the Colorado Petroleum Industries Committee, on jobber problems and organization.

F. W. McCurry, of Wichita, vice-president of the Derby Oil Co., on refining. McCurry will illustrate his address with a complete miniature glass refinery.

The Chek-Chart Corp. film on "Correct Lubrication Means Plus Profits."

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H. J. Thompson Dies

N. P. N. News Bureau

TULSA, Nov. 14. — H. J. Thompson, aged 55, of The Texas Co.'s engineering and drafting department, Fort Worth, Tex., died suddenly Nov. 13 at Wichita Falls, Tex. Prior to his connection with Texaco, Thompson was with the Carter Oil Co., in Tulsa. Survivors include in addition to his widow, a son, H. J. Jr., a student at Texas Tech.

Oil Union Now Claims 98,900 Members

WASHINGTON, Nov. 14. — Oil Workers International Union now has 98,900 members, according to the report of Chairman John L. Lewis, prepared for presentation at the first constitutional convention of the Committee for Industrial Organization, which opened today at Pittsburgh. Total membership of C.I.O. was reported as 4,037,877.

Whence The "Varnish"?

By Arch L. Foster, Technical Editor

In order to effectually prevent the petroleum refining and automotive engineers from becoming fat and complacent, to be sure that they do not develop the idea that they are "plenty good" and so become mentally lazy, Dame Nature and the unceasing attempt to progress both continue to throw more and more problems at these aforesaid engineers.

To their eternal credit, be it noted, no matter how much they may wrangle as to the modus operandi by which they shall attain progress and no matter how much buck-passing may be indulged in during the process, we almost invariably find that, when the "tumult and the shouting dies" they have left the human race with something more desirable than it possessed before.

A few short and busy years ago, the gasoline makers walked ahead of the engine builders, making motor fuels of octane ratings in excess of the immediate requirements of the then existing engines. But not for long; engine designers double-timed until their product got the best performance possible out of the new fuels. Then for a time engines forged ahead, that is, they could have used better fuels than were universally available. In recent years, fuel anti-knock qualities and engine design have kept a singularly even pace. Little fault may be found with the anti-knock performance of automotive engines with any of hundreds of brands of non-premium fuels. Correlation of development between refiners and engine builders, though not perfect, is so improved as to give an outstanding example of teamwork hardly paralleled in modern industrial history.

More recent developments in engines appear to have yielded the by-product of oxidation troubles in lubricating oils. It is not our purpose or province here to attempt to decide *who* is responsible for these problems, none of them of a critical nature. Of paramount interest to all concerned is, *what* is responsible for such problem as exists today.

Several automotive engineers say their companies have not found any serious problem of "varnish" formation from oils in engines. Some have found enough of a problem at least to warrant their attacking it to discover the cause and to remedy it. True it is, in industrial as well as in medical science, that preventive medicine is far superior to mere curative efforts. So, if the trouble has appeared but has not yet become serious, we have all the more reason for licking it before it assumes large proportions.

These premises seem self-evident at this stage; that automotive equipment will advance further in operating under more severe conditions, possibly needlessly severe conditions sometimes, as one and then another company forges ahead with radically different developments. Also, that such conditions as unit bearing pressures, localized temperatures, compression pressures and combustion temperatures may be increased gradually, indefinitely. Also, that refiners can and will make whatever quality of product is required, within the limits of knowledge or progress in the chemistry of oils and of chemical science in general.

If the refiners find that an oil more resistant to oxidation or what-not is really needed they will make it so. If the engine designer demands a more refractory oil, it is enjoined on him to show that a real and bona fide advance in engineering science is dependent on the use of such an oil. Technical improvement without a proper return in performance is insufficient excuse for itself if the costs are high.

The Siamese twins, oil and automotive, are indissolubly bound to follow parallel paths; any mutual problems must be mutually solved. Buck-passing is no part of a solution in either case.

Gasoline From Coking

Study of the program of the Refining Division of the American Petroleum Institute Meeting this week gives a clear, if not entirely complete picture of the state of advancement of refining processes. With few if any exceptions, the subjects discussed are those which are of paramount interest in refining circles, and the developments made public affect importantly some of the major refining probems.

However, no meeting could be extensive enough or

Refining Technology

Contents

Whence the "Varnish"? **R-537**

Hydraulic Decoking of Coke Chambers—by W. F. Court **R-540**

High impact-producing water jets replace the cable method of removing coke from chambers at Shell's Wood River refinery. Decoking is now done in two hours or less and the decoking crew is cut from 20 to 11 men.

Continuous Coking of Residuum by the Delayed Coking Process—by R. J. Diworky **R-548**

Development of this type of process was prompted by the high cost of the earlier conventional batch process. Its advantages have been proved in several years of operation.

Revivification Characteristics of Bauxite Used in Percolation Filtration—by R. H. Hubbell, Jr. and R. P. Ferguson **R-555**

Pennsylvania and Mid-Continent cylinder stocks, bright stocks and neutral distillates are compared in bauxite percolation efficiencies along with the sharply contrasted Colombian distillate and petrolatum, the latter showing the greatest advantage.

"State of the Art" as Seen in the World's Current Technical Literature **R-560**

Advertisers' Index ..... **R-567 and 52**

extend over a long enough period to permit discussion of all the subjects of primary importance to refiners. To mention some individual problems and methods for solving them; refiners are plagued by too great production of heavy fuel oil, resulting in low prices and too great stocks. At this meeting Diwoky, of Standard of Indiana, shows how 22.4% of gasoline is produced directly from coking heavy residuum, plus 69% of gas oil, and 12.4% of coke, the gas oil being presumably a refractory but suitable stock for charging to the cracking coils. This follows the publication two weeks ago of another article in Refining Technology by Watson of Universal Oil Products, showing how total gasoline yield may be increased up to 15-20% by running to coke instead of to heavy fuel oil.

Removal of coke from the chambers is one of the time-consuming and relatively expensive operations unavoidable in cracking to coke. In an article this issue, Court, of Shell Petroleum Corp., shows how coke may be removed by a water jet at terrific pressures (900-1000 lbs. per sq. in.) in from 50% to nearly 70% less time and requiring about half the former number of workmen. Time is the most valuable commodity in any industrial operation, especially when time means work-hours. This development reduces appreciably the overall cost of coking operations and contributes to the advantages of running to coke.

Catalysis is playing a progressively more vital role in refining operations; catalytic treatment of lubricating oils, catalytic polymerization of gases, hydrogenation of unsaturates, all have become commercial operations in one or a large number of plants. The most interesting recent development is the Houdry process, reputedly a catalytic cracking process, several huge units of which have been built or are under construction.

Papers presented at the institute meeting on this intriguing development discuss the major principles employed in cracking heavier oils to gasoline at relatively low temperatures and pressures to produce motor fuel blending naphtha of very high octane number. There are those who believe that modern refining will follow the lead of these few catalytic developments, and that catalysis will become the major principle in refinery processing of the future. There is a considerable amount of evidence to indicate that this opinion may be essentially correct, though prophecy at this point is too rash.

Filtration and filter media have received impetus during recent years in a number of instances. New media, Porocel, Filtrol, Magnesol X-yte, and other products are changing the picture in the filter plant and it requires vigilance and energy to keep up with these developments and to utilize them to the best cost and quality advantage.

Bauxite, a natural alumina product, is the base for efficient developments, and the revivification discussion by Hubbell and Ferguson at the institute meeting brings very useful information to the refiner on making these products "pay off" in the plant. These institute papers add much to the available information on the equipment which the refining technologist has available to aid his work.

Dr. S. T. Yuster, associate professor of Petroleum and Natural Gas Engineering at Pennsylvania State College, was recently appointed to the committee on Core Analysis and Electrical Logging, American Petroleum Institute.

Born in Manchester, England, Dr. Yuster came to America in 1909 as a small child, was educated at North Dakota State College and the University of Minnesota, receiving the Ph. D. degree in physical and organic chemistry from the latter in 1934. During this period of time he spent two years as chemist with the U. S. Bureau of Standards in San Francisco, in testing and analysis of petroleum products, and his doctor's thesis was on "Chlorination of Propane".

In his present position he is in charge of water flooding research at Penn State as a part of the Mineral Industries Experiment Station there.

Lubricant Problems Listed On A.S.M.E. Program

NEW YORK, Nov. 12. — Thin Oil Films, by Walter Claypoole, and Wear in Lubrication Problems, by L. M. Tichvinsky will be discussed at the 59th annual meeting of the American Society of Mechanical Engineers in New York, Dec. 5-9. Among 16 other divisions of the activities of the society are a number of papers which will be of interest to petroleum technologists.

Pipe stress problems will be discussed by H. W. Semar who has determined the expansion forces in piping by model tests. There will be a progress report on creep tests of tubular members and on relaxation tests also.

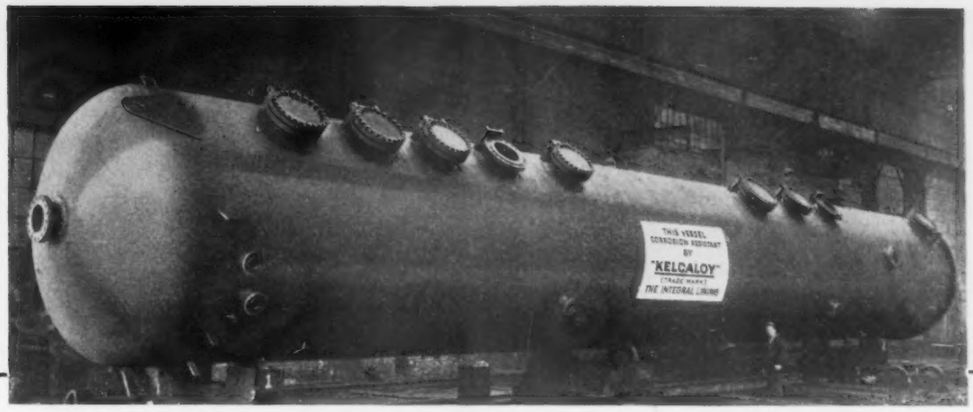
Five Years Progress of Oil and Gas-Power is the subject of H. E. Degler, on the program for Dec. 7. He will be followed by G. J. Dashefsky, who will describe a new instrument used in the solution of problems in the design of internal combustion engine—the Vectorscope.

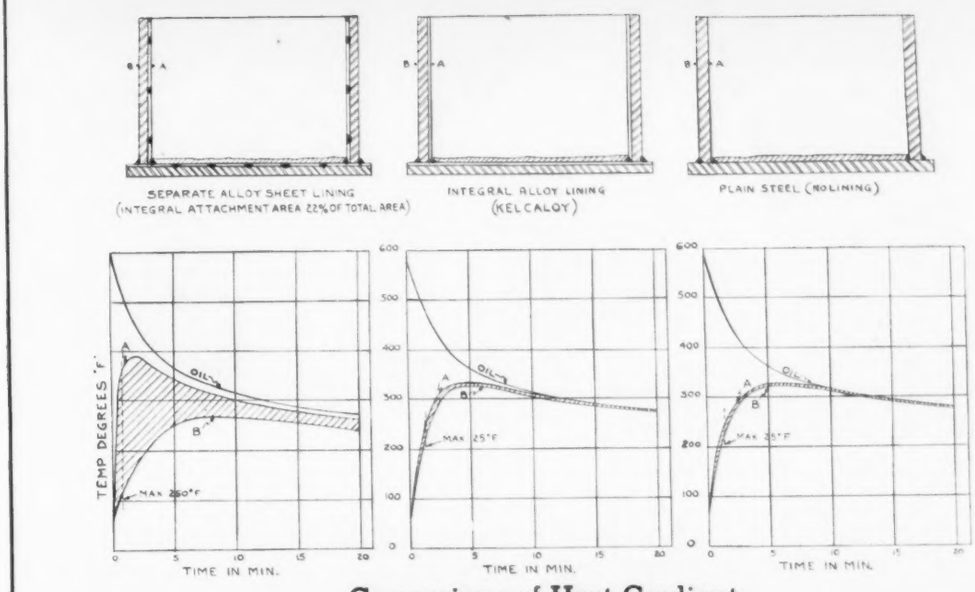
Under the general heading of fluid meters, E. E. Ambrosius will review flow-nozzle research with oil and W. S. Pardoe will deal with the effect of high temperatures and pressures on cast-steel venturi tubes. Four other subjects are also scheduled for this session.

New Edition, ASTM Standards

The 1938 edition of A.S.T.M. Standards on Petroleum Products and Lubricants has been issued by the American Society for Testing Materials. It gives, in their latest approved form, 61 test methods, eight specifications and two lists of definitions of terms relating to petroleum and to materials for roads and pavements.

In addition, a proposed method approved for publication as information and for comment, is given covering ignition quality of diesel fuels. The 350-page report (6 x 9-inch pages) also details numerous changes in the standards. Paper bound copies, now in double column format, are available at society offices, 260 S. Broad St., Philadelphia.





Comparison of Heat Gradient

COMPARE THE HEAT GRADIENTS

Liner stresses in lined pressure vessels are reducible only by increasing the rate of heat transfer. This is best done by using plates of which the lining material is an integral part. Kelcaloy pressure vessels possess this most desirable quality.

A comparison of the heat gradients of a separate alloy sheet lined vessel, a Kelcaloy Vessel and a plain carbon steel vessel—obtained under exhaustive tests—proved conclusively that the maximum difference in temperature obtained between the inner and outer skin of the separately lined vessel was 250° F. while the maximum difference in both the Kelcaloy and the plain carbon steel vessel was exactly the same 25° F.

Complete laboratory data on this and other tests—which prove conclusively the superiority of corrosion resistant vessels built of Kelcaloy plates—are contained in a new booklet which will be mailed on request.

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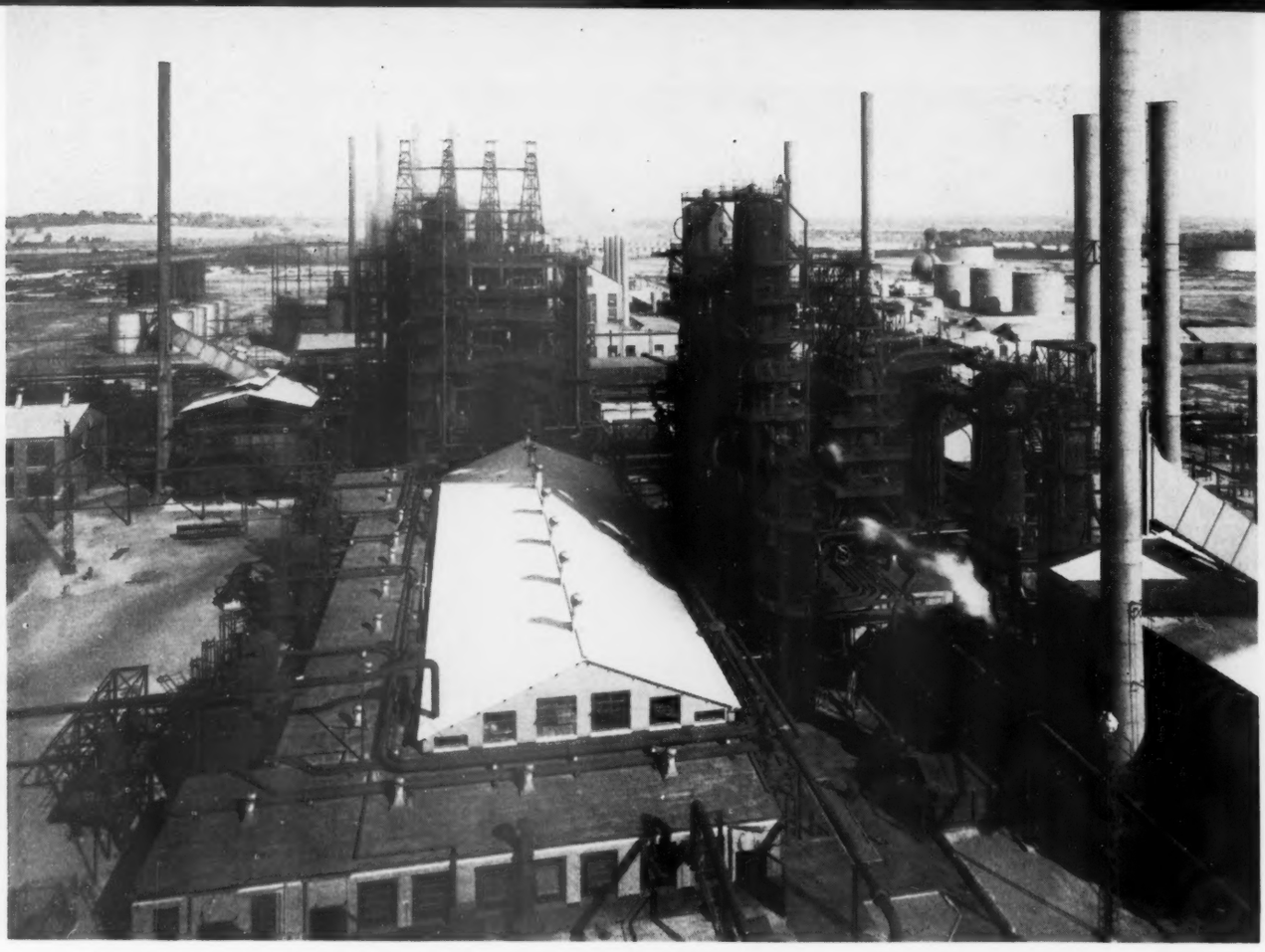

Fig. 1. General view of the combination cracking and coking Unit No. 17 at Shell's Wood River refinery

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Hydraulic Decoking Of Coke Chambers†

By W. F. Court*

Abstract

Hydraulic decoking by high impact-producing water jets has displaced the conventional cable method of disrupting the coke bed in coking chambers at the Wood River refinery of Shell Petroleum Corp. The clean-out time is now within two hours and the saving in time is at least 50 per cent and often 67 per cent in favor of the hydraulic method.

The method has eliminated hazardous and unhealthful jobs requiring a clean-out crew within the chambers and has reduced the crew from 20 to 11 men with an appreciable labor cost saving.

The use of high pressure water jets for disrupting and removing coke from a chamber now makes possible the use of pumps instead of railroad cars for transporting coke to the yard pile, hoppers, or screens. There are indications that a solution to coke-degradation problems will be found. Elimination of cable-fastening wire, usually present in coke, is a welcome solution to a marketing problem.

A NEW and improved method of disrupting and removing coke from coke chambers on cracking and coking units has been developed by the Shell Petroleum Corp., and is now in commercial use. The method consists of cutting the coke by means of high impact-producing water jets.

The following description pertains to an installation and operation of hydraulic decoking equipment now in commercial operation on a large continuous Dubbs combination cracking and coking unit, known as "Dubbs 17," at the Wood River refinery of the Shell Petroleum Corp.

This unit was designed by engineers of Universal Oil Products Co. in collaboration with engineers of the Shell Petroleum Corp. A general view of the unit is shown in Fig. 1. The unit combines three processing operations, and receives as feed 16,500 barrels of raw material daily—comprising 8500 barrels of topped crude, 2000 barrels of gas oil, and 6000 barrels of pressure distillate. It produces 7000 barrels per day of 70-octane gasoline (exclusive of the

* Shell Petroleum Corp., St. Louis, Mo.

†Presented at Nineteenth Annual Meeting, American Petroleum Institute, Chicago, Nov. 14-18, 1938.

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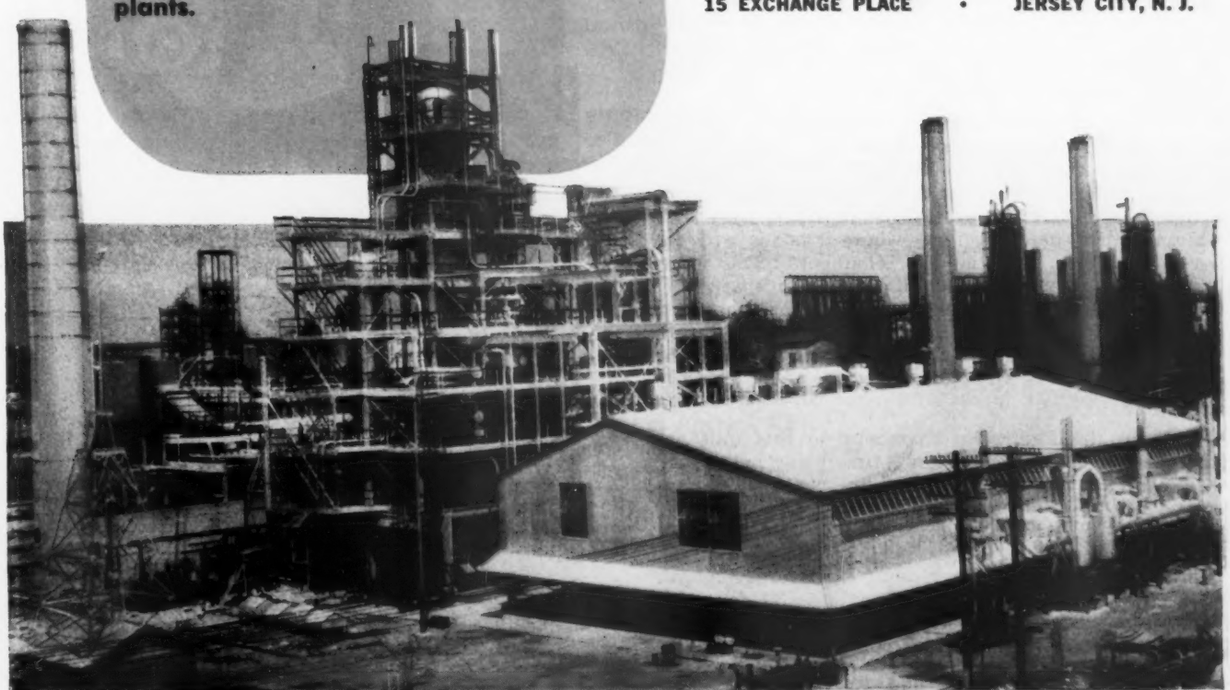

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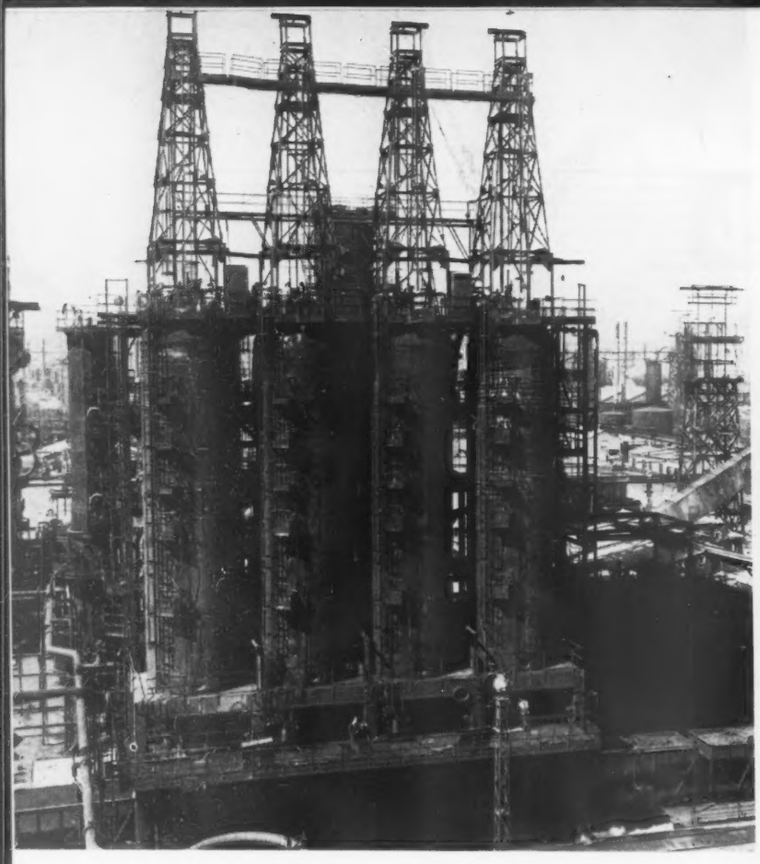

Fig. 2. The four coking chambers are 13 feet in diameter and 50 feet high. They are used in a 48-hour cycle, only one at a time being on stream. Two are cleaned each day of 150 tons each of coke

gasoline topped off the pressure-distillate portion of the charge) and approximately 300 tons of coke per day.

The primary cracking section consists of two full-flashing two-coil selective cracking units. The coking section includes an Equiflux heater of special design for heating heavy cracked residuum, four coking chambers each 13 feet in diameter by 50 feet high, and a fractionating column with necessary condensers, etc.

One of the striking features of the operation of this unit is the re-cracking of cracked residuum to gasoline and coke. Cracked residuum of approximately 4° API gravity is withdrawn from the flash chamber of the primary cracking section, and transferred to the bottom of the fractionating column on the coking section—where it mixes with the heavy re-cycle stock from the coke chambers. This material is then withdrawn by a hot-oil pump and charged to the Equiflux heater on the coking section, entering at a temperature of 760 to 780° F. It is further heated therein to a temperature of 925° to 950° F. before entering the coke chambers. These chambers operate at a pressure of 125 to 135 lb. per sq. in.

At present the four coke chambers on this unit are used in a 48-hour cycle, only one at a time being on stream. The others are cut in when needed by means of switch valves, and in this manner the coking operation is carried on continuously. Each chamber is filled within 10 feet of the top, equivalent to approximately 150 tons of coke. Two chambers are cleaned every day. The average length of runs on the coking section of this unit is 30 days, the longest run to date having been 45 days. A photograph of the coking chambers on this unit is shown in Fig. 2.

The conventional cable method formerly was used to remove the coke from the coke chambers on this installation. This method consisted of suspending layers of steel cable laid in spiral form throughout the chamber. At the end of the operating cycle, which in this case was about 9 hours, the chamber was valved off, and the pressure released. It was then steamed, and cooled with water—after which the cable was pulled by means of a hoist, thereby disrupting and removing the coke from the chamber.

The cable method has now been displaced by the hydraulic method of decoking, which was developed and worked out on 10-ft. x 40-ft. coke chambers.

Operation

In the hydraulic decoking method, the hydraulic cutting nozzles are attached to special tools mounted at the end of a hollow stem, to which water is supplied from a high-pressure header through a steel-piping linkage made flexible by ball-bearing swivel joints. This stem is suspended from an overhead structure mounted above the chamber, and is lowered and raised within the chamber by means of an air hoist.

The operation of removing the coke comprises essentially two steps, viz.:

1. Boring a hole downward through the coke bed.
2. Cutting and removing the coke from the chamber.

In the first step a hole approximately 18 inches in diameter is bored downward through the coke bed by means of a revolving cutting head or boring tool which derives its power from the reaction of water jets discharging horizontally.

The boring operation is made in two steps to save excessive height in the overhead structure, and is interrupted at a point halfway down through the coke bed, in order that the stem may be lengthened sufficiently to carry the operation completely through the bed. The water discharging from the nozzles of the boring tool drains readily through the coke bed, and out of the bottom manway. A photograph of this boring tool is shown in Fig. 3.

In the second step, the boring tool referred to above is removed from the stem at the bottom of the chamber,

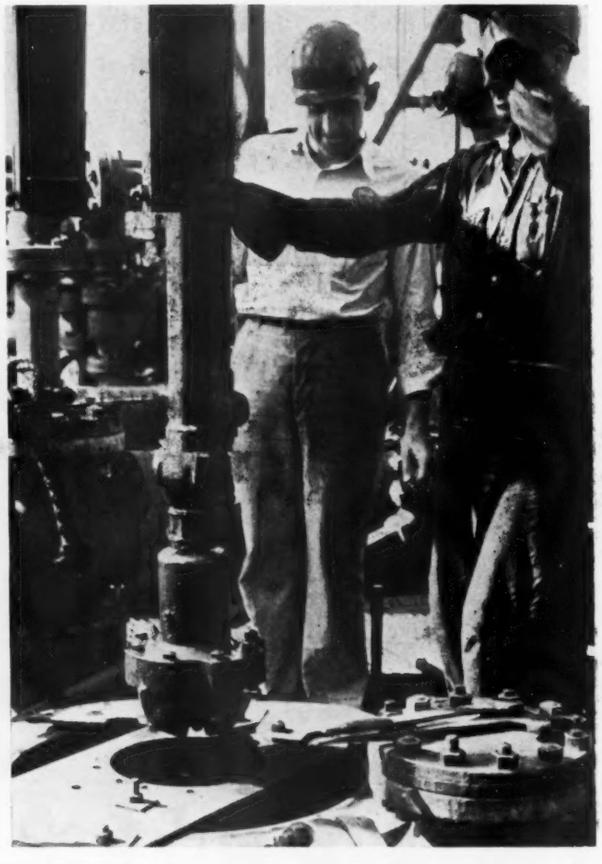

Fig. 3. This hydraulic boring tool cuts an 18-inch hole down through the coke bed, being rotated by the reaction of water jets between the cutting blades

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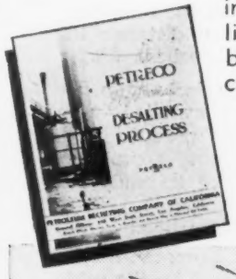

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and replaced with a part of the assembly of cutting nozzles. The complete cutting assembly of nozzles used in this operation is divided into two sections, a "top section" and a "bottom section." The "top section," which has two nozzles, is elevated into the chamber first, in order to make an enlarged opening in the coke bed at the bottom of the chamber so that the "bottom section" of the assembly can enter. After an enlarged opening has been cut at the bottom of the coke bed, the stem is lowered and the "bottom section" of the assembly is attached to the "top section," and the complete cutting assembly is then raised into the chamber.

The nozzles in the "top section" direct their jets horizontally, and the streams of water penetrate the coke bed to the chamber wall. The nozzles are offset so that the reaction from the streams of water rotates the nozzle assembly, thereby cutting the coke bed into layers as the assembly is raised in successive steps by the operator. The "bottom section" has two nozzles pointing slightly upwards at an angle, and serve to cut the coke away from the wall. As the coke is cut into layers by the revolving jets, it breaks away and falls to the bottom of the chamber.

The cutting operation is likewise interrupted at a point half-way up through the coke bed in order that the stem may be shortened sufficiently to carry the operation completely through the bed to the top of the chamber.

A photograph of the final cutting assembly is shown in Fig. 4. During the cutting operation the coke and water fall through the bottom manway of the chamber directly into side-dump railroad cars. The movement of these cars is accomplished by means of an electric "car puller" controlled from a push-button station at the operating platform under the chambers.

The water draining from the coke cars falls onto a concrete floor, and the fine coke it contains is washed into trenches. The trenches are provided with flushing jets so as to wash the fines into a collecting pit. The coke fines accumulating in this pit are continuously withdrawn as a "slurry" by means of a special centrifugal pump, and re-circulated back into a partly-filled or into a full coke car—where the coke bed in the car acts as a filter to collect the fines.

Water from the coke-fines collecting pit passes through a screen into another compartment of the pit, and is pumped to a settling tank—where a further settlement of coke fines is effected. Coke fines accumulating in this settling tank are likewise re-circulated as a slurry to the railroad cars. The clear water from the settling tank flows into a surge tank, from which it is again pumped by a high-pressure jet pump to the cutting nozzles in the chamber. The rate of flow to the cutting nozzles is approximately 700 gallons per minute under a pressure of 900 to 1000 pounds at the entrance of the nozzles.

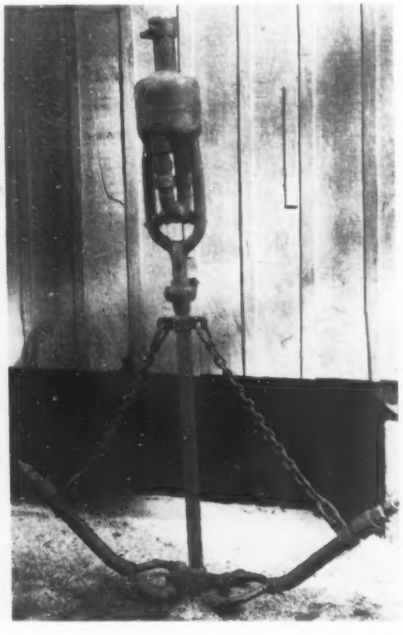

Fig. 4. The hydraulic cutting assembly starts at the bottom of the bored hole and is hoisted upward as the coke is loosened and drops out the bottom of the tower

A drawing of the four coking chambers on the combination cracking and coking unit referred to above is shown in Fig. 5, and illustrates the operating steps. In chamber No. 1 the hydraulic boring tool is shown just entering the top of the coke bed, while in chamber No. 2 it is shown emerging through the bottom manway. In chamber No. 3 the "top section" of the final cutting assembly is shown making an opening in the coke bed in order to allow the "bottom section" of the assembly to enter. In chamber No. 4 is shown the complete final cutting assembly as it cuts away the coke.

Development of Hydraulic Decoking Method

From the foregoing description it will be concluded that decoking a chamber by this method is a relatively simple operation, requiring a minimum of mechanical equipment. The simplicity of design and operating technique, however, represents the result of a very large amount of development and experimental work. The nozzles, for example, presented quite a problem of design, inasmuch as such nozzles must produce a jet of water having a minimum of "stream spread" at a distance of 6 feet to 8 feet from the nozzle tip in order to obtain the necessary impact for maximum coke-cutting effect and speed.

Many nozzles of different designs were constructed and tested only to be discarded before a satisfactory design was developed. While considerable technical data are available on nozzle designs for other services and for relatively low pressures, design data covering this particular problem were not available. It was necessary, therefore, to follow the "cut-and-try" method in order to develop a satisfactory design.

While considerable technical data are available on nozzle designs for other services and for relatively low pressures, design data covering this particular problem were not available. It was necessary, therefore, to follow the "cut-and-try" method in order to develop a satisfactory design.

Many nozzles of different sizes also were tried at varying pumping rates and pressures—with the result that, after a lengthy period of development work and experimentation, the correct sizes and shapes for the most economical pumping rates and pressures were determined.

In collaboration with the Worthington Pump and Machinery Corp., the nozzles now used were perfected to a point where satisfactory impact is obtained at a distance of 8 feet from the nozzle tip, and at this distance the diameter of the effective stream is only 1¾ inches.

Many different designs of cutting tools, nozzle assemblies, and sequences of operating steps were tried—with the result that the present equipment and practice have reached a stage where it is possible to remove completely 150 tons of coke from a chamber and have it ready for heading up again in less than two hours.

The hydraulic method of decoking is applicable to the removal of coke of any degree of hardness. Sometimes coke is so hard as to present difficulties in removal by the cable method. Such coke, however, readily is removed by the hydraulic method. The percentage of lump- and egg-size coke produced by the hydraulic method is comparable with that produced by the cable method.

Experience has shown that degradation, i.e., breakage of coke, results mostly from its falling into the chamber and from subsequent handling, and bears little relation to the method of removal used. The hydraulic method has opened new possibilities for reducing greatly the degradation. It also has opened up a new method of transporting coke.

There are also very definite indications that the use

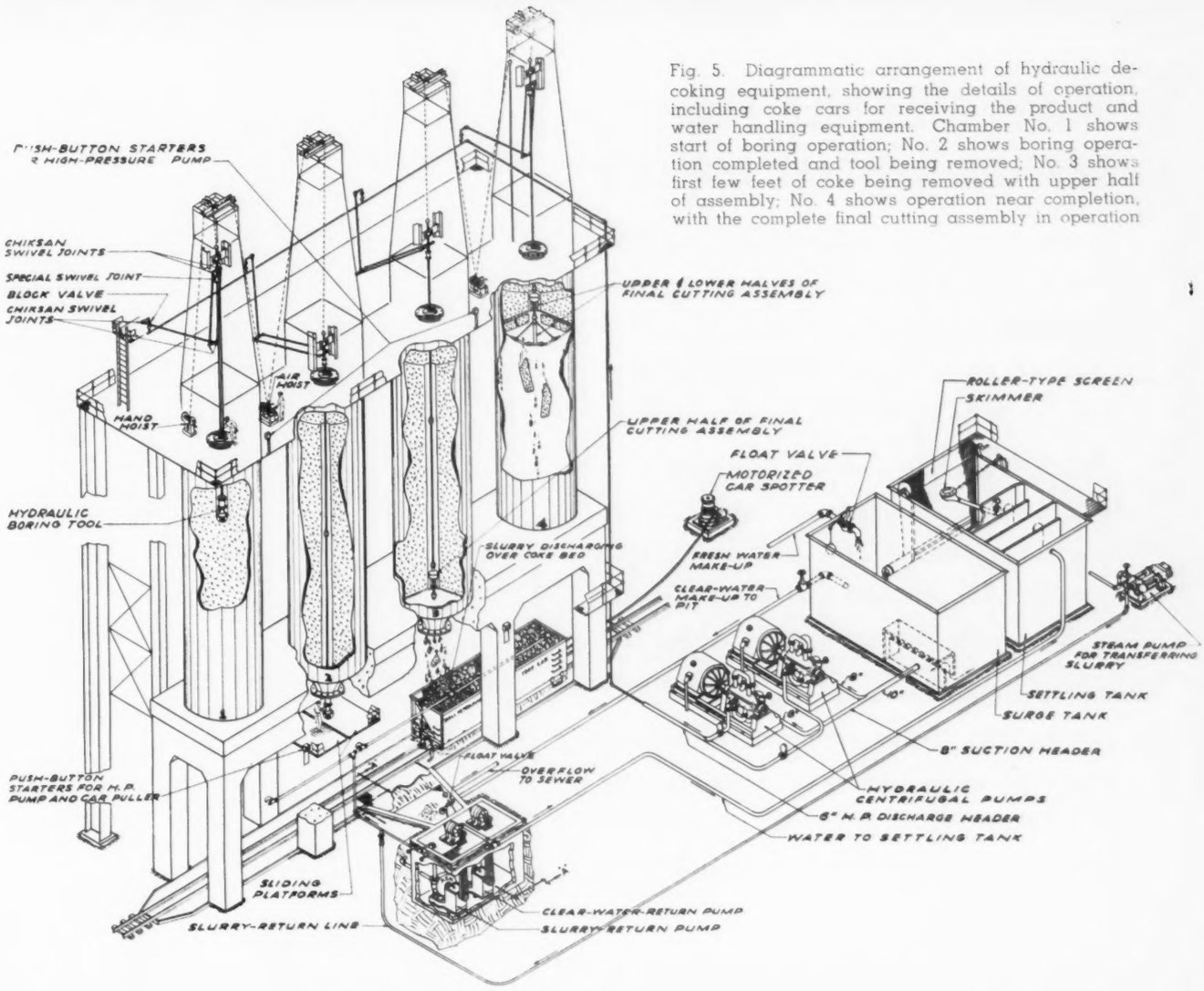

Fig. 5. Diagrammatic arrangement of hydraulic decoking equipment, showing the details of operation, including coke cars for receiving the product and water handling equipment. Chamber No. 1 shows start of boring operation; No. 2 shows boring operation completed and tool being removed; No. 3 shows first few feet of coke being removed with upper half of assembly; No. 4 shows operation near completion, with the complete final cutting assembly in operation

of railroad cars for receiving and transporting coke to the storage yard or screening plant now can be done away with entirely. It has been demonstrated by tests conducted by The Allen-Sherman-Hoff Co. that coke and water in the correct ratio can be pumped by means of a special centrifugal pump to the coke pile, into hoppers, or directly to the screening plant. Surprising as it may seem, little degradation results from pumping. The indications are that such a system would be cheaper to operate and maintain than the conventional railroad-car system.

Advantages

The conventional cable-pulling method formerly used required the hanging of cable within the chamber before coking operations could commence, pulling of the cable for disruption of the coke bed following the run, sending men into the chamber for removal of coke adhering to the chamber wall and, finally, re-hanging the cable in preparation for the next run.

Removal of coke by the hydraulic method revealed the following advantages over the cable method:

1. The clean-out time for the 13-ft. x 50-ft. chambers has been reduced at least 50 per cent, and complete removal of the coke from a chamber within two hours is now a frequent occurrence—the record to date being one hour and 40 minutes. Any time saved in clean-out operations usually is an on-stream time gain.

2. The clean-out crew, including the men required for cleaning piping, etc., has been reduced from 20 to 11 men.

3. An important saving has been effected by eliminating the cost of cable, cable clamps, cable hooks, fastening wire, etc.

4. Cable-fastening wire, usually present in coke removed by the cable method, has been eliminated by the hydraulic method—a welcome solution to a marketing problem long sought by those responsible for the screening and marketing of petroleum coke.

5. In the hydraulic decoking method all coke completely is removed from the chamber wall by the hydraulic jets; hence, men are not required to scale the coke from the wall.

6. With the hydraulic method it is not necessary for the clean-out crew to enter the chamber at any time; hence, one of the greatest hazards to health and limb to which this class of labor was formerly exposed has been eliminated

General

The hydraulic pumps are driven by electric motors especially built for the cycle of operations. A standby high-pressure pumping unit is provided on the Wood River installation.

Experience to date indicates that the cost of maintenance of the jetting nozzles is very low. They are equipped with renewable tips which obviate the necessity for replacing a complete nozzle when wear occurs.

Tests have indicated that the cutting action of the jets has no effect on the steel walls of the vessels.

The swivel joints used in the piping linkage between the high-pressure header and the stem are standard equipment, and the expense for their maintenance to date has been negligible.

The hydraulic method of decoking chambers and the hydraulic method of conveying coke away from chambers are covered by patents and patent applications owned by Shell Development Co., Worthington Pump and Machinery Corp., and The Allen-Sherman-Hoff Co.

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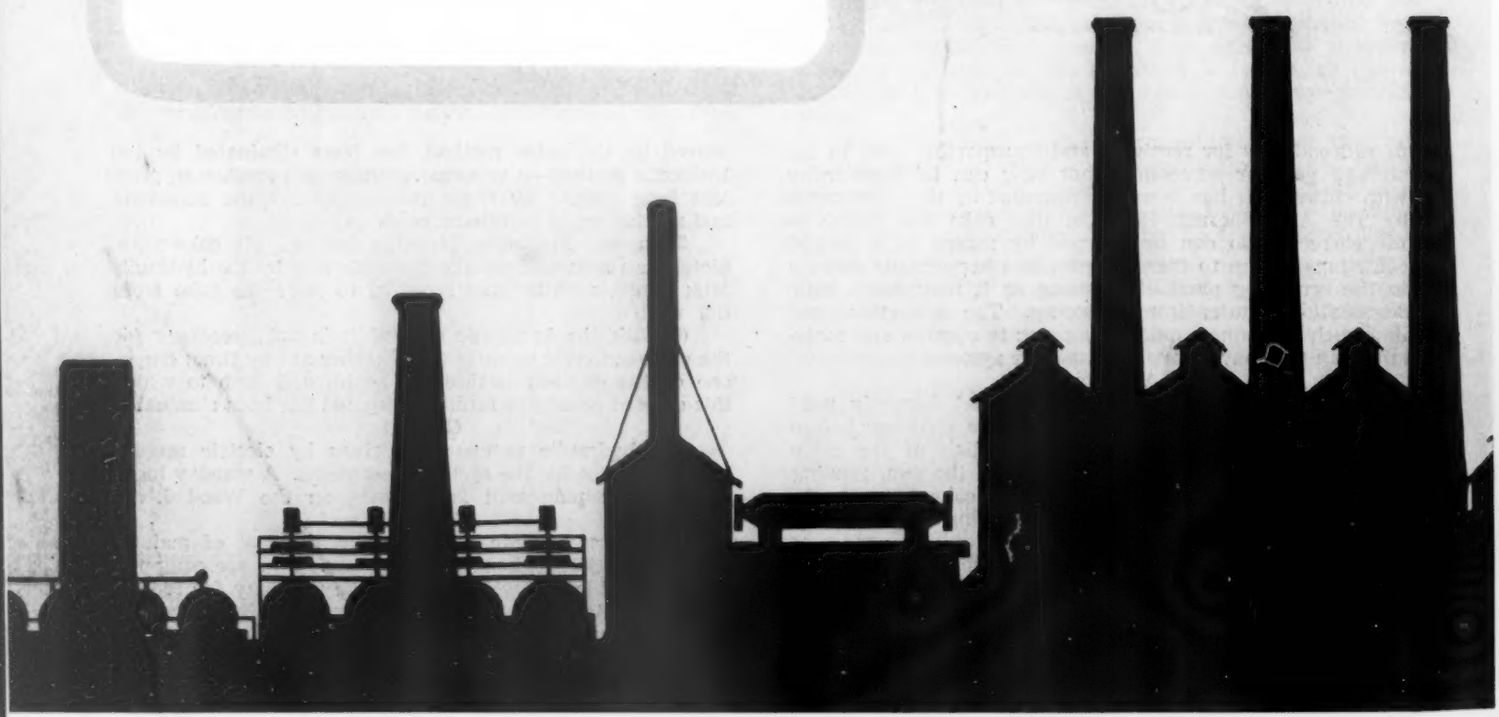

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Continuous Coking of Residuum By the Delayed Coking Process†

By R. J. Diworky*

Abstract

Continuous coking by the "delayed coking" process has been in use by Standard Oil Co. (Ind.) since 1930 and was first applied to a combination crude-running and cracking unit early this year. The development of this continuous coking method was prompted by high cost of the earlier conventional batch method and offers several advantages over the older method.

The process is accomplished by passage of charging stock through a furnace into one of several vertical drums, where coking is effected by its contained heat. Coke removal is effected by cable pulling. The widespread use of the coking operation today may be accounted for probably by the higher gasoline yields which it affords.

COKING has for many years been an important process in the refining of petroleum. It is well known that, by a combination of crude-residuum coking and gas-oil cracking, a higher over-all gasoline yield is obtained from crude than by the combination of residuum viscosity breaking and gas-oil cracking. The widespread use of coking in present-day refining operations can probably be attributed to the higher gasoline yields obtainable by this process. The high cost of the earlier methods of conventional batch-still coking, however, has led to the development of continuous coking methods which offer appreciable advantages over the older method. The "delayed coking" process developed by the Standard Oil Co. (Ind.) has been in commercial operation for several years, and is superior to the batch-still method in many respects.

This process is based on the principle of rapidly heating the stock to be coked to a high temperature and charging the heated material into a vertical coking drum, where coking is effected by means of the contained heat. Thus, while the temperature of the residuum leaving the heating coil is sufficiently high to cause coking, the time of contact in the furnace is short, and actual formation of coke is delayed until the stock is introduced into the coking drum. This has suggested the name of "delayed coking."

One of the first commercial applications of this process was a unit constructed by the Standard Oil Co. (Ind.) at its Whiting refinery in 1930 for processing Mid-Continent reduced crude. A more recent application was the incorporation of the delayed-coking principle in a combination crude-running and cracking unit put into operation by the same company early in 1938. Inasmuch as the process as applied in both plant installations is essentially the same, a complete description of only the earlier unit is included here.

The important features of this process are covered by patents issued in the U. S. and foreign countries.

The coking unit described herein has a capacity of 2860 barrels (42-gal.) per day of Mid-Continent reduced crude of a gravity of 19.0° API. A simplified flow sheet of this unit is shown in Fig. 1. The Mid-Continent residuum at a temperature of 685° F. is withdrawn from a crude-reducing unit (not shown) and pumped to the furnace, where it is heated to coking temperature.

The furnace employed in this unit is a typical radiant- and convective-section heater. The feed enters at the bottom of the convective section and passes upward countercurrent to the flow of the combustion gases. Parallel flow through two tubes is employed in the lower half of the convective section, and series flow in the upper half. The oil then enters the radiant section, in which only series flow is employed. The radiant section contains tubes on each side wall and on the front wall, and the hot oil passes in a U-shaped path through the lowest tubes on the three walls, then back over the reverse route in the second lowest tubes, and so on. After passage through the wall tubes, the oil flows through a single row of roof tubes, and out of the furnace. The temperature at the roof outlet is 910° F. in normal operation.

The furnace is equipped to burn both gas and oil. Forced- and induced-draft fans operate in connection with

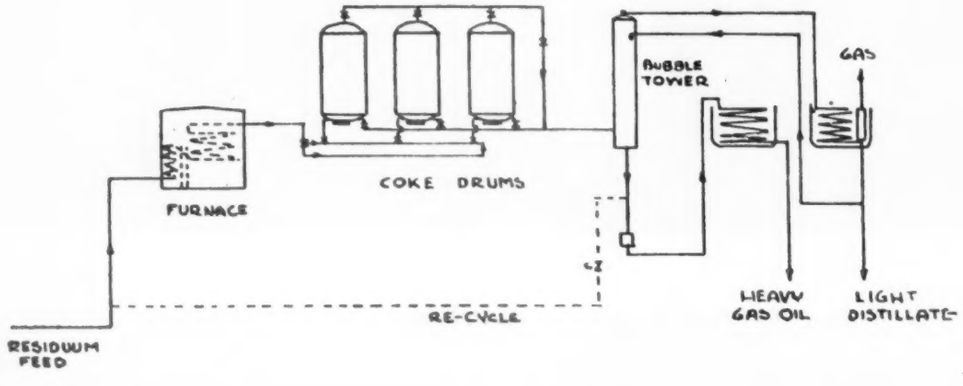

Fig. 1. Process flow diagram for continuous residuum coking by the "delayed coking" process

* Standard Oil Co. (Indiana) Whiting, Ind.
†Presented at the Nineteenth Annual Meeting, American Petroleum Institute, Chicago, Nov. 18, 1938.

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After leaving the furnace the residuum enters a "circulating ring," and from this ring is withdrawn to the coking-drum bottom inlet. The hot residuum flows around the ring in two directions from the point of entrance, being proportioned by valves at this point. The flow through each side of the ring is regulated manually to maintain the desired temperature in each leg. The two streams meet at the point of exit, and the combined stream is discharged into the coking drum. This method of introducing the charge into the drums provides, as will be noted, a system of lines which has no dead ends. The undesirable deposition of coke at various points is thereby avoided, and the diversion of the hot-oil stream from one drum to another is facilitated.

The heated residuum flows from the circulating ring into the bottom of the coking drum at a uniform rate, until the drum is filled with coke—the time required being determined by previous experience. Three coking drums are provided so that operation is continuous. The coking drums are of riveted construction, each 16 ft. in diameter and 35 ft. in height. The upper head is ellipsoidal, and contains a manhole 2 ft. in diameter. The lower head is conical with a slope of 45 deg., and has at the bottom a manhead 6 ft. in diameter. The lower manhead is hinged to a carrier on a monorail so that it can be pushed out of the way during the coke-removing operations. Suitable vapor, steam, and water lines are connected from each drum to the common respective headers for the three drums to provide adequate means for alternating the drums during the coking cycle.

The method of coke removal used in this particular installation is by cable pulling. The cables are supported in the drums at definite levels progressively increasing in distance apart as the top of the drum is approached. On each level are 10 hooks welded to the walls of the drum and spaced equally around the circumference, so that 5 wires may be placed across the diameter of the drum. These wires are used to support six 1000-ft. lengths of ⅞-in. cable. The cable is coiled in flat spirals on the under side of the wires, and is held in place by means of bag ties, which consist of short lengths of wire with the ends twisted together.

The hot vapors from the drum are introduced into a fractionating tower of the bubble-cap type. The naphtha produced in the coking operation passes overhead from this tower and through a water-cooled coil to a gas separator. Cold naphtha is pumped back to the fractionating tower to provide reflux. Heavy gas oil, suitable for cracking-unit charging stock, is withdrawn from the bottom of the fractionating tower through a box cooler.

Operation of the Unit

Operation of the unit as a whole is continuous. In normal operation each drum is filled with coke in 36 hours. During the latter part of the coking cycle on each drum, the hot overhead vapors are passed downflow through the next drum to be used in order to preheat this drum in preparation for receiving the stock to be coked. When the desired amount of coke has accumulated in the first drum, the hot feed is switched to the second drum. The first drum is allowed to stand for 24 hours in order to increase the hardness and decrease the volatile matter content of the coke. The drum is then cooled by steaming for 15 minutes, followed by water cooling for one hour.

The drum is then ready for cleaning. The manheads are removed, and a cable leader is run from a winch and attached to the end of the cable in the coke. The cable is pulled at a rate of 40 to 60 feet per minute. The coke, falling on a chute, is quenched and discharged into a railroad car. A record is kept of the number of times each cable is pulled. Inasmuch as the coke is hardest and the pulling the most difficult in the bottom of the drum, each new cable is used in the lowest position until it has been pulled 12 times. It is then moved to the next higher position for 12 pulls, and so on—until, after 72 pulls, the cable is discarded. The cables increase in diameter by formation of coke between the strands—until finally they become too bulky for satisfactory use. Rarely is a cable discarded because of mechanical failure. The total time to remove the manheads and pull the cable is about four hours.

Table 1—Distribution of Time in a Typical Coke-Drum Cycle

Operation	Time Required (Hours)
Coking	36
Setting	24
Steaming	¼
Water cooling	1
Removing heads; pulling cables, scraping, rewinding cables, and replacing heads	32¾
Steaming	2
Vapor heating	12
Total cycle	108

After the cable has been pulled, the coke adhering to the walls of the drum is removed by hand. The cross-wires and cable are then placed in position working downward through the drum. After the cable has been mounted, the top and bottom manheads are replaced, the air in the drum is expelled with steam, and the drum is heated by vapors from the preceding drum in the manner described above. The time required for the total cycle is 108 hours. A summary of the distribution of time for the various operations is given in Table 1.

Typical operating data for the unit are summarized in Table 2.

Table 2—Operating Conditions for Delayed-Coking Unit

Flows, bbl. (42-gal.) per hour:	
Residuum charge	119
Bubble-tower condensate	80
Bubble-tower net overhead	24.3
Bubble-tower top reflux	27
Temperatures, deg. F.:	
Residuum to furnace	685
Residuum to coke drums	910
Coke-drum vapors	784
Bubble-tower bottom	576
Bubble-tower top	308
Furnace temperatures:	
Above convective section	1,270
Leaving convective section	834
Pressures, lb. per sq. in., gage:	
Charge to furnace	160
Coke drums	3.8

In general, coking within the furnace roof tubes and sometimes in the upper wall tubes limits the length of runs. After 900 to 1,000 hours of continuous operation the pressure drop through the furnace has increased approximately 100 lb. per sq. in., and there are visible indications of localized overheating of the roof tubes. The effects of "on-stream" time on the operating conditions of the furnace are shown in Table 3.

The feed rate is varied somewhat, depending on the character of the residuum and also the condition of the furnace; but, in general, is about 106 to 119 barrels per hour.

Yield and Quality of Products

The product yields obtained under normal conditions of operation are summarized in Table 4.

The yield of stabilized gasoline of 400° F. end point is 22.4 per cent of the residuum charged to the coking unit. This gasoline has an ASTM octane number of 55.0, and a Reid vapor pressure of 8.0 lb. per sq. in.

The coke produced differs somewhat throughout the drum. In the lower section the coke is dense, with hardly any visible porosity, and the volatile matter is low. At higher levels, the coke progressively becomes softer, more brittle, and the volatile matter increases. The hardness of coke produced by delayed coking is compared in Table 5 to that of coke produced in horizontal batch stills. This comparison is based on a quantitative method for determining the hardness—which consists of dropping a 25-pound weight from a height of 30 inches onto lumps of coke weighing 50 grams each, and noting the percentage of material thus produced, which is retained on a sieve

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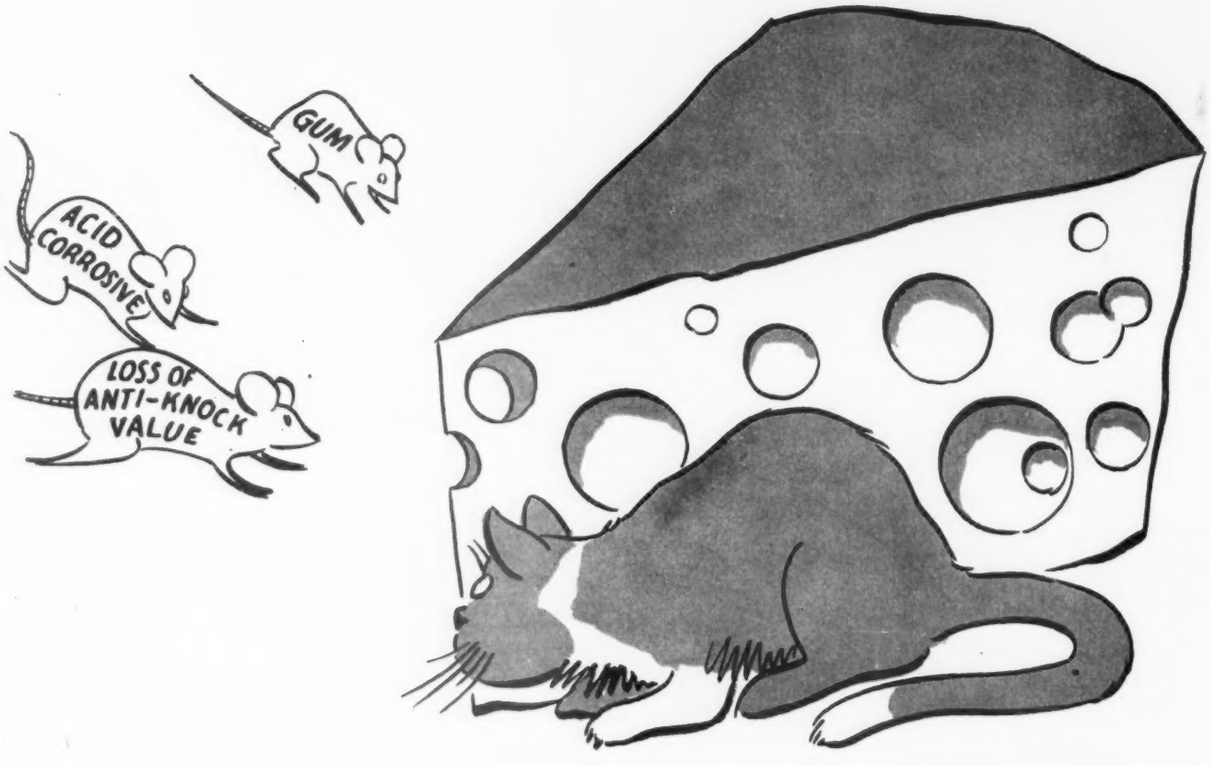

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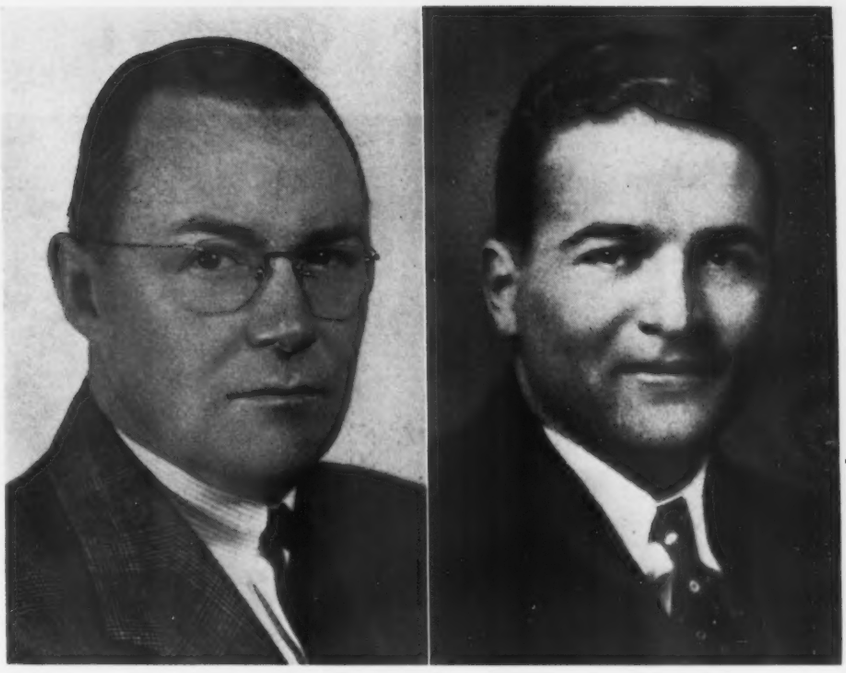


Left:
W. F. Court, assistant chief engineer of Shell Petroleum Corp., St. Louis, speaks on "Hydraulic Decoking of Coke Chambers."

Right:
Roy J. Diwoky, chemical research department of Standard Oil Co. (Ind.) at Whiting, Ind., speaks on "Continuous Coking of Residuum by the Delayed Coking Process."

of ½-inch mesh. If all the coke is retained on the sieve, the hardness is 100. If all of it passes through the sieve, the hardness is 0.

The average volatile-matter content of the coke is approximately 10.5 per cent by ASTM Method D-271-33. Usually the volatile matter of coke from the top of a drum will be about 2 to 3 per cent higher than that of coke from the bottom of the drum.

Table 5 Comparison of Coke Hardness

	Hardness
Delayed coking:	
Bottom of drum	85
Middle of drum	71
Top of drum	59
Horizontal batch-still coking:	
Bottom	94
Middle	89
Top	55

Factors Affecting Coke Characteristics

The production of substantial quantities of lump coke (material retained on a 3-in. grizzly) is desired, because usually a higher price can be obtained for lump coke than for screenings. Therefore, an important objective in the operation of the delayed-coking unit is the adjustment of conditions to produce the maximum coke hardness consistent with reasonable ease of removal from the drum. It is possible to produce coke of such hardness that frequent cable breakages occur; and, as a result, the drums cannot be kept on schedule, and the unit must be shut down. The principal conditions which appear to control coke hardness are: 1, furnace-outlet temperature; 2, time coke is allowed to remain at elevated temperatures; 3, efficiency of drum insulation; and, 4, characteristics of the residuum.

Several experimental runs have been made in which a furnace-outlet temperature of 925° F. was employed (normal temperature is 910° F.). This type of operation increased the percentage of lump coke by about 12 per cent. Approximately the same increase may be obtained by allowing the coke to stand in the drum at the coking temperatures for a period of 12 to 20 hours before cooling. In cases where drum equipment is available, the latter method will result in fuel economies, inasmuch as lower furnace temperatures will be required for the same production of lump coke.

From the preceding discussion it is apparent that the efficiency of insulation will be a factor affecting coke hardness, inasmuch as it affects drum temperature. The addition of cracked residuum to the charging stock also tends to increase the hardness of the coke. It has been observed in several experimental runs that the introduction of 10 to 15 per cent cracked residuum into the charging stock will increase markedly the coke hardness, and the percentage of lump coke will be increased by about 10 to 15 per cent at constant temperature and coking time.

The ultimate gasoline yield, including that from cracking the coke-still gas oil, can be improved by recirculating the heavy ends of the coke-still gas oil within the coking system. This principle was employed in construction of a large combination crude-distillation, gas-oil-cracking and coking unit which recently started operation.

TABLE 3

Effect of Time on Stream on Furnace Operation

		Temperatures (Deg. F.)				Pressures (Lb. Per Sq. In., Gage)			
Hours Operating	Flow (Barrels Per Hour)	Into Furnace	Into Wall Tubes	Into Roof Tubes	Furnace Outlet	Into Furnace	Into Wall Tubes	Into Roof Tubes	Furnace Outlet
15	108	650	774	872	909	160	150	127	14
900	106	635	824	900	912	240	220	170	17

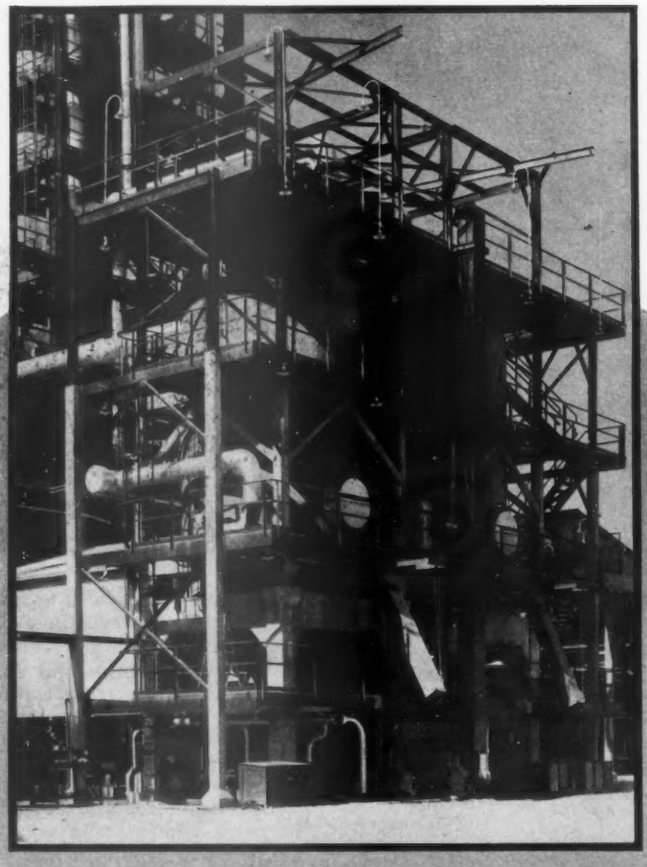
TABLE 4

Yields from Coking Mid-Continent Residuum (Gravity, 19.0 Deg. API)

	Yield (Per Cent of Residuum)	Gravity (Deg. API)
Gas	7.2 (per cent by weight)	1.398 (specific gravity)
Light distillate	20.4 (per cent by volume)	53.6
Heavy distillate	67.2 (per cent by volume)	24.4
Coke (dry)	12.4 (per cent by weight)	
	107.2	

Yields Corrected to 400 Deg. F. End Point, Stabilized Gasoline

Gas	4.5 (per cent by weight)
Gasoline	22.4 (per cent by volume)
Gas oil	69.1 (per cent by volume)
Coke	12.4 (per cent by weight)
	108.4



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CLAY TREATING

Revivification Characteristics OF Bauxite Used in Percolation Filtration†

By R. H. Hubbell, Jr. and R. P. Ferguson*

Abstract

Investigation of the effect of continued revification on the adsorptive qualities of bauxite reveals that the revivification characteristics of this material vary with the type and source of stock handled and the method of filtration substantially as follows:

a. In the solution percolation of residual stocks bauxite retains throughout its life an efficiency of approximately 85 per cent of its initial value.

b. In the straight percolation of bright stocks, average values in the vicinity of 80 per cent of new material are obtained.

c. The bauxite filtration of distillate stocks requires the maintenance of low temperatures of revivification. Under optimum conditions values of 55 to 60 per cent of No. 1 bauxite are maintained in the percolation of Pennsylvania neutrals.

d. Bauxite manifests a great advantage over other adsorbents in the percolation of petrolatums and related stocks, owing to the high yields and the tasteless and odorless character of the products.

e. Fresh bauxite exerts a "solvent" action greater than that of fullers earth, a characteristic which diminishes with repeated re-burning. With fresh material, improved carbon and increased API gravity are obtainable, but only at some sacrifice in viscosity.

CONTINUED interest in bauxite as a filtering medium, as indicated by its adoption by numerous refineries for the percolation of lubricating-oil stocks, has been due largely to the fact that it possesses the property, under certain conditions, of indefinite revivification without substantial degradation in adsorptive power.

The precise extent of this degradation, however, is of paramount importance to the refiner who desires to arrive at a sound economic comparison between bauxite and other commercial adsorbents; and it is, therefore, felt that a detailed analysis of revivification characteristics is justified.

In a previous discussion[1] the authors have presented an analysis of the fundamental characteristics of bauxite, including a discussion of the influence of variables not encountered in commercial operation with such adsorbents as fullers earth. The conclusions reached in this study briefly may be summarized by stating that, in the percolation of residual stocks, optimum results are obtained by operation at the maximum practicable temperatures of burning and filtration, whereas best results in the decolorization of light-colored distillate stocks require operation at the minimum practicable burning and filtering temperatures.

New bauxite was also shown to exhibit a "solvent" effect upon finished-oil quality somewhat greater than that of other adsorbents, a characteristic which was shown to be substantially lost after continued re-burning, and to be of little practical significance—inasmuch as it was accompanied by a rather pronounced drop in viscosity. No data were presented, however, to show the influence of re-burning upon the decolorizing efficiency.

It is the objective of the present discussion, therefore, to analyze the effect of continued revivification upon both the decolorizing value and the "solvent" action of bauxite—basing the conclusions upon actual plant revivification, inasmuch as laboratory re-burning is, in this respect, notoriously inconclusive. In view of the fact that the efficiency loss suffered by bauxite on continued re-use, as well as its average efficiency in comparison with fullers earth, is profoundly influenced by the type and source of stock to be treated, it has been felt desirable to include data covering the filtration of a number of oils.

Included, therefore, are the solution percolation of Pennsylvania and Mid-Continent residual stocks; the straight filtering of dewaxed Pennsylvania and solvent-extracted Mid-Continent bright stocks; the percolation of Pennsylvania neutrals and acid-treated Columbian distillates; and the filtration of a Pennsylvania petrolatum stock.

For each of these services it is proposed to illustrate: 1, the degree of degradation suffered by bauxite through a number of plant revivifications; 2, the average decolorizing efficiencies to be anticipated as compared with new bauxite and with No. 1 fullers earth of the improved, or extruded, type now available; and, 3, the influence of revivification upon the "solvent" action of bauxite as shown by finished-oil tests.

Both laboratory and plant data are included, the results presented in tabular form representing the laboratory evaluation of plant-burned samples, which were re-dried prior to testing; while the curves are intended to represent the average results to be anticipated in plant operation on the various stocks. The conclusions are derived largely from operation in a plant in which bauxite is utilized through nine re-burnings for distillate filtration, during which period it is maintained at low burning temperatures, and following which it is revivified at 1250° to 1300° F. for subsequent use in residual-stock filtration. Laboratory procedures used have been discussed previously.[2]

Throughout this discussion all bauxite values are expressed in terms of No. 1 bauxite and of freshly-burned fullers earth—no attempt being made to cover herein the average efficiency of fullers earth on re-burning, inasmuch as refinery practice varies in this respect, and optimum

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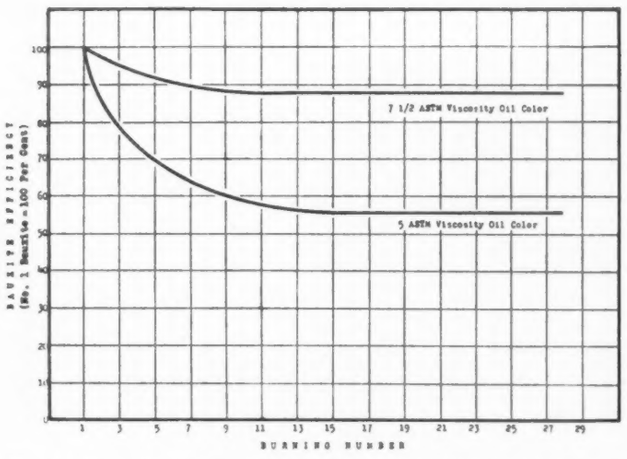

Fig. 1. The effect of number of burns upon the percolation efficiency of bauxite when used in filtration of Pennsylvania cylinder stock in 60% naphtha dilution to finished viscosity oil colors of 5 and 7½ ASTM

values previously have been presented.[3,4] In the following sections, where data are presented on solution filtration, the filtrate oil color is expressed in terms of the "viscosity oil color" rather than color of the oil-naphtha filtrate.

Solution Percolation of Residual Stocks

1. Pennsylvania Cylinder Stock

The curves in Fig. 1 demonstrate the effect of burning number from 1 to 28 upon the percolation efficiency of bauxite used in the filtration of Pennsylvania cylinder stock in 60 per cent naphtha dilution to finished viscosity oil colors of 5 and 7½ ASTM—all burnings having been effected at temperatures of 1200° to 1300° F. It will be observed that when finishing to 7½ ASTM color the yields manifest a gradual drop through the first few revivifications, following which the values level off at some 87 per cent of that of new, or No. 1, bauxite. Inasmuch as new bauxite exhibits an efficiency slightly higher than that of No. 1 fullers earth on a volume basis, it will be seen that the average value of bauxite in terms of new fullers earth becomes 90 per cent. Inasmuch as this efficiency is maintained throughout the life of the bauxite (60 to 70 cycles if handling losses average in the vicinity of 1.5 per cent per burning) the economic advantage for bauxite over fullers earth in this type of service readily is apparent.

It should be pointed out, however, that the foregoing are based upon a finished viscosity oil color of 7½ ASTM. The efficiency of bauxite at lighter colors drops off rather rapidly, and settles at a lower value, as shown by the efficiencies given at 5 ASTM viscosity oil color in Table 1—although, in this connection, it must be noted that the initial value, as compared with fullers earth, is quite high at 5 color (138 per cent by volume) a fact which offsets the greater drop in efficiency.

Inasmuch as in normal operation fresh bauxite will be added as make-up following the burning of a given charge, the filter yields obtained for a given stock will be quite uniform. This constitutes one of the chief advantages of bauxite operation, viz., the possibility of the prediction of filter yields with, consequently, more satisfactory and uniform filter-house operation.

As stated previously, the "solvent" action of bauxite is relatively pronounced in the early stages of its adsorbent life, but gradually diminishes until the point is reached at which this action, as shown by finished-oil inspections, is no greater than that of other commercial adsorbents. For example, reference to Table 1 shows that, in filtering Pennsylvania cylinder stock through freshly-burned bauxite, a 7½ color oil is produced which shows a gravity of 27.6° API, a Conradson carbon content of 0.75 per cent, and a viscosity of 132 sec. at 210° F. (undewaxed). On the other hand, filtration of the same stock through No. 25 bauxite resulted in a gravity of 27.1, a carbon of 1.35, and a viscosity of 136—these latter values being in close accord with the tests of the oil treated with fullers earth. It is felt, therefore, in the light of these and other similar data, that the markedly lower carbon and higher API gravity attendant upon bauxite filtration are obtainable only from fresh material, and then are accompanied by some sacrifice in viscosity.

Perhaps the most significant practical aspect of the foregoing lies in the effect of bauxites upon finished-oil "cast" or "bloom," a factor which is related definitely to the "solvent" action of the bauxitic adsorbents. Experience in this connection has shown that, as bauxite passes through several revivifications, the finished-oil cast improves—until, ultimately, a point is reached at which the bloom is comparable to that imparted by new fullers earth. The precise burning number at which this condition is reached is a variable depending upon individual stocks and conditions, but it may be accelerated by underwashing or by otherwise increasing the burning temperature at which revivification is carried out.

2. Acid-treated Mid Continent Residual Stock

While considering the subject of solution filtration, it is felt significant to discuss the percolation (60 per cent naphtha) of an acid-treated steam-sweetened Mid-Continent

TABLE 1

Bauxite Percolation of Pennsylvania and Mid Continent Cylinder-Stock Solutions

Adsorbent	Bauxite (30- to 60-Mesh)								Extruded Fullers Earth (30- to 60-Mesh)		Bauxite (30- to 60-Mesh)								Extruded Fullers Earth (30- to 60-Mesh)	
Percolation tests:	Pennsylvania "A" Cylinder Stock										Mid Continent Cylinder Stock									
Stock used																				
Gravity, deg. API	26.1										23.8									
Viscosity (Saybolt Universal) at 210 deg. F., sec.	155										147.5									
Conradson carbon, per cent	2.1										2.2									
Solution naphtha, per cent	60										60									
Filtering temperature, deg. F.	180										180									
Burning temperature, deg. F.	1,200		1,200-1,300		1,200-1,300		1,200-1,300		900		1,200		1,200-1,300		1,200-1,300		1,200-1,300		900	
Adsorbent burning No.	1		5		15		25		1		1		6		13		20		1	
Adsorbent density, lb. per cu. ft.	56.9		58.8		59.5		59.8		31.6		56.9		58.9		59.3		59.9		31.6	
Finished viscosity oil color, ASTM	5	7½	5	7½	5	7½	5	7½	5	7½	5	7½	5	7½	5	7½	5	7½	5	7½
Viscosity oil yields:																				
Barrels (42-gal.) per ton	4.5	6.8	3.0	6.2	2.6	5.9	2.3	5.8	5.9	12.0	6.3	8.7	3.9	8.0	3.2	7.4	2.8	7.2	8.7	17.1
Barrels (42-gal.) per 1000 cu. ft.	128	194	88.2	183	77.4	176	68.9	174	93	190	177	248	115	235	95	219	84	216	137	270
Percolation efficiency, per cent:																				
Weight basis	100	100	67	91	58	87	51	85	131	177	100	100	62	92	51	85	44	83	138	197
Volume basis (No. 1 bauxite equals 100 per cent).	100	100	69	94	60	91	54	90	72	98	100	100	65	95	54	88	48	87	77	119
Finished oil (undewaxed):																				
Gravity, deg. API	...	27.6	...	27.3	...	27.2	...	27.1	...	27.2	...	25.0	...	24.9	...	24.6	...	24.5	...	24.4
Viscosity (Saybolt Universal) at 210 deg. F., sec.	...	132	...	133	...	134	...	136	...	136	...	119	...	124	...	125	...	129	...	129
Conradson carbon, per cent	...	0.75	...	1.10	...	1.21	...	1.35	...	1.40	...	1.2	...	1.33	...	1.45	...	1.55	...	1.5

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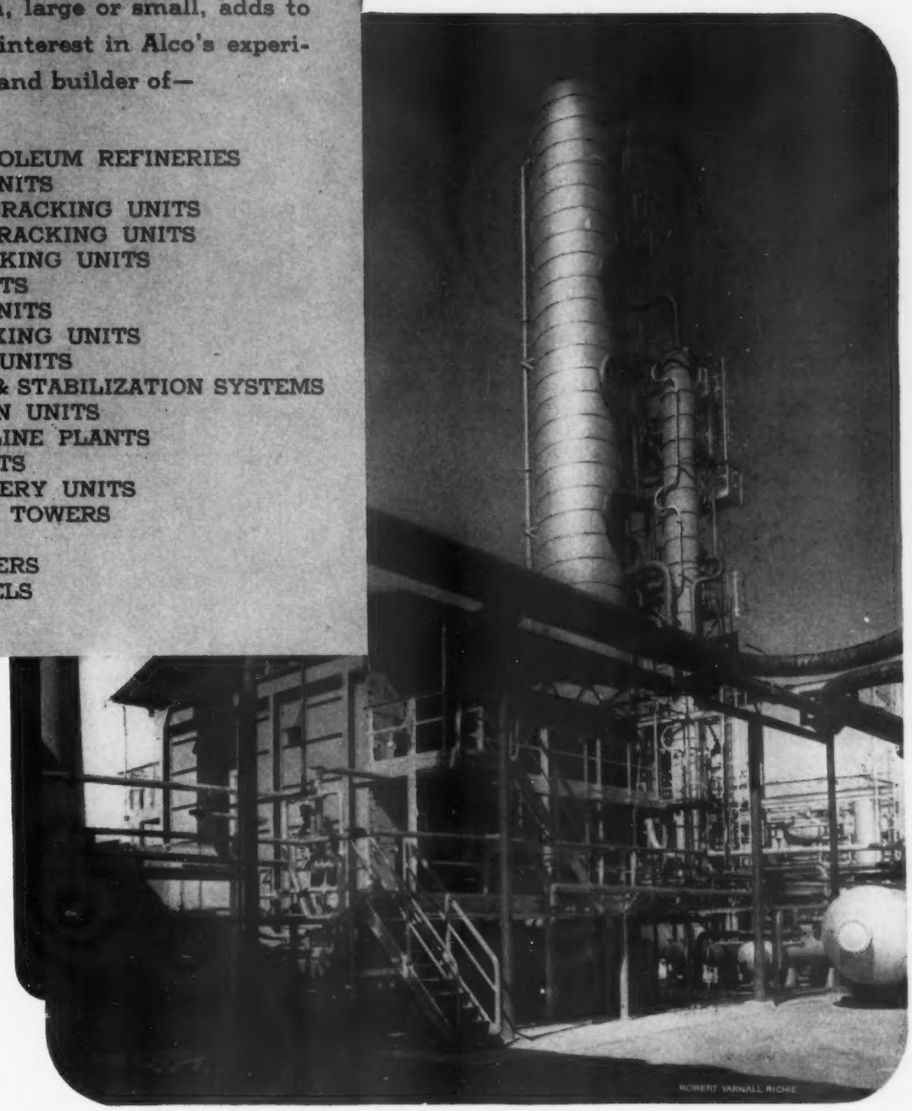

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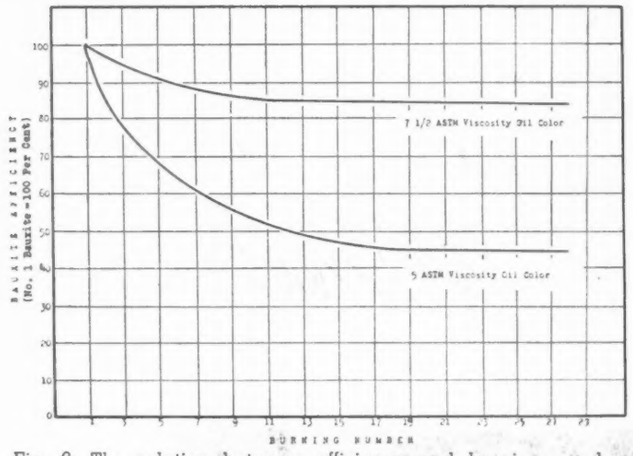

Fig. 2. The relation between efficiency and burning number with Mid-Continent residual stock is essentially similar to that with Pennsylvania cylinder stock

residual stock, which is illustrated in Fig. 2. It will be noted that the relation between efficiency (No. 1 bauxite = 100 per cent) and burning number is essentially similar to that which prevailed in the case of the Pennsylvania stock, the average efficiency to which the curve settles being of the same order of magnitude. The value of the new material in terms of extruded fullers earth, however, is of the order of 92 per cent on a volume basis. This figure is some 10 per cent lower than the corresponding value for the Pennsylvania stock, although the economic advantage over average fullers-earth operation is still clearly evident.

The influence of burning number on the finished oils produced from the Mid-Continent stock is also shown in Table 1, and serves to confirm the conclusions drawn relative to the Pennsylvania oil, viz.: that, as revivification progresses, the finished-oil cast and inspection data tend to approach those characteristic of fullers-earth filtration.

Before concluding the consideration of solution percolation, it is felt advisable to point out an additional factor bearing upon the average results obtainable with bauxite, i. e., the gradual accumulation in the system of magnetic iron oxides and other materials such as fire clay, tramp iron, etc. There is present in all bauxite iron oxide in varying amounts which, owing to its dispersion throughout the bauxite grains, and to the fact that the greater part exists as Fe_2O_3, is difficult to remove economically. However, after passage through several refinery cycles, during which the material is burned in the presence of carbon, the iron content assumes the form of discreet particles of magnetic material which, coupled with contamination from the burning and handling equipment, constitutes a considerable body of inert matter.

Experience has shown that the difference in specific gravity between the bauxite and the iron-oxide particles is sufficient to provide a sharp separation by the use of conventional gravity-separating means—which also serve to remove impurities of lighter weight because of their larger size. The periodic purging of the filter-house charge by some such method is, therefore, felt to be warranted.

Straight Percolation of Bright Stocks

1. Pennsylvania Bright Stock

Fig. 3 illustrates the filter finishing of a Pennsylvania bright stock which, prior to dewaxing, had been solution-filtered through fullers earth. The efficiency in terms of new material again is plotted against the burning number, and it is to be noted that bauxite utilized in this service suffers a slightly greater degree of efficiency loss than that characteristic of solution filtration. For example, the

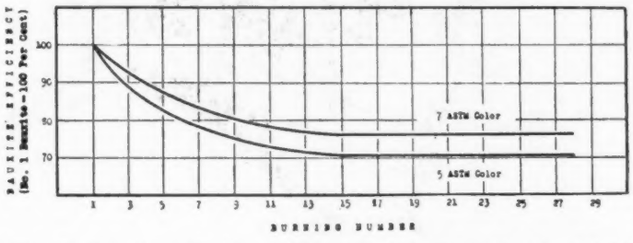

Fig. 3. Bauxite utilized in filter finishing Pennsylvania bright stock which, prior to dewaxing, had been solution-filtered through fullers earth, suffers a slightly greater efficiency loss than is characteristic of solution filtration

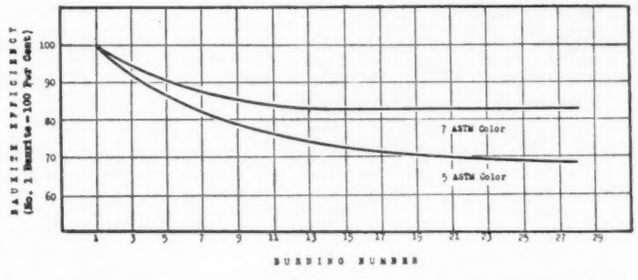

Fig. 4. Average bauxite efficiency on solvent-extracted Mid-Continent bright stock is similar to its efficiency with more paraffinic stock. Bauxite can be used to advantage on stocks of this type

TABLE 2

Bauxite Percolation of Pennsylvania and Mid Continent Bright Stocks

Adsorbent	Bauxite (30- to 60-Mesh)								Extruded Fullers Earth (30- to 60-Mesh)		Bauxite (30- to 60-Mesh)								Extruded Fullers Earth (30- to 60-Mesh)	
Percolation tests:																				
Stock used	Dewaxed Pennsylvania Bright Stock										Dewaxed Solvent-extracted Mid Continent Bright Stock									
Gravity, deg. API	25.6										25.5									
Viscosity (Saybolt Universal) at 210 deg. F., sec.	153										164									
Conradson carbon, per cent	1.54										0.79									
Filtering temperature, deg. F.	220										210									
Burning temperature, deg. F.	1,200		1,200		1,200		1,250-1,350		900		1,200		1,200		1,200		1,250-1,350		900	
Adsorbent burning No.	1		4		8		25		1		1		5		9		20		1	
Adsorbent density, lb. per cu. ft.	56.9		58.0		59.0		59.8		31.6		56.9		58.8		59.2		59.9		31.6	
Finished viscosity oil color, ASTM	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7
Viscosity oil yields:																				
Barrels (42-gal.) per ton	5.2	76	4.5	68	4.3	62	3.7	59	9.5	153	61.1	11.2	5.5	10.2	4.8	9.9	4.3	9.2	11.6	23.1
Barrels (42-gal.) per 1,000 cu. ft.	148	2,160	131	1,975	127	1,830	111	1,765	150	2,420	174	319	162	300	142	293	129	275	183	365
Percolation efficiency, per cent:																				
Weight basis	100	100	87	90	83	82	71	78	183	201	100	100	90	91	79	88	71	82	190	206
Volume basis (No. 1 bauxite equals 100 per cent)	100	100	88	91	86	85	75	82	101	114	100	100	93	94	82	92	74	86	105	114
Finished oil:																				
Gravity, deg. API		26.3		26.2		26.2		26.1		26.2		26.0		26.0		25.9		25.8		25.8
Viscosity (Saybolt Universal) at 210 deg. F., sec.		142		143		147		148		147		144		145		145		146		146
Conradson carbon, per cent		1.3		1.44		1.49		1.44		1.45		0.5				0.65		0.55		0.6

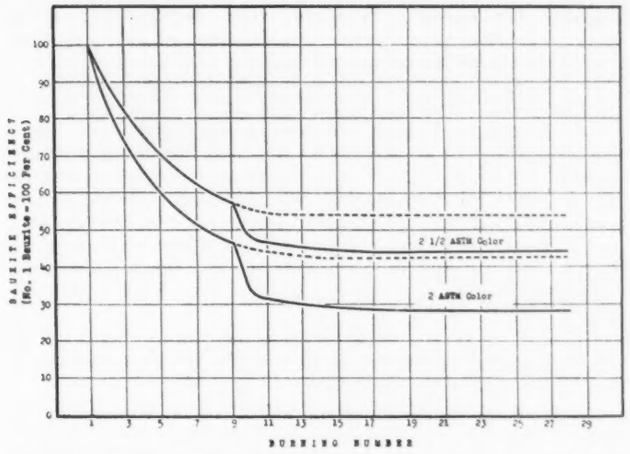

Fig. 5. Differences in efficiencies are shown for high and low temperatures of revivification of bauxite in filtration of Pennsylvania neutral distillate. The dotted lines show efficiencies for low temperature revivification. Segregation of low-burned material is desirable and readily effected

yields at 7 ASTM color indicate an ultimate bauxite efficiency of approximately 78 per cent of new material—which is equivalent to a volume-basis value of 70 to 75 per cent of No. 1 extruded fullers earth.

Previously-stated conclusions relative to finished-oil quality likewise apply to straight filtering as demonstrated by the data in Table 2. It should be pointed out, however, that, inasmuch as cast is usually of paramount importance in this type of filtration, it is advisable to operate at the maximum practicable temperatures of burning and filtration, under which conditions the "solvent" action of the bauxite adsorbents is lessened. Furthermore, attention is directed to the fact that oils filtered through bauxite at elevated temperatures (250° to 300° F.) do not manifest the "cracked" odor characteristic of fullers-earth operation under similar conditions—thus enabling the refiner to take advantage of the high yields and improved-cast characteristic of high-temperature filtration.

2. Mid-Continent Bright Stock

The average results attendant upon the filtration through bauxite of a solvent-extracted Mid-Continent bright stock are summarized in Fig. 4. In this case the average bauxite efficiency is found to be similar to that prevailing in the case of the more paraffinic stock, owing to the solvent extraction and the fact that the Mid-Continent stock was somewhat darker in color. The yield at which the bauxite curve levels is shown to be approximately 82 per cent of that of the No. 1 material, and the average efficiency compared to No. 1 improved fullers earth is in the vicinity of 75 to 80 per cent if based on equal volumes—indicating that bauxite can be used to advantage on stocks of this type.

The tests of the finished oil produced are summarized in Table 2, the figures bearing out the aforementioned conclusion that percolated-oil quality approaches that obtained with fullers earth as the bauxite matures, and that "quality pick-up" is obtainable from bauxite only at some sacrifice in viscosity.

Distillate-Stock Percolation

1. Pennsylvania Neutral Distillate

Satisfactory filtration of light-distillate stock is one of the chief problems associated with the use of bauxite as a commercial adsorbent—depending, as it does, upon the maintenance of low burning temperatures. Inasmuch as there is a practical lower limit to the temperatures at which occluded oil and color bodies can be burned out of the material, it is virtually impossible to escape some degradation in efficiency. Experience has shown, however, that, provided revivification be effected at the lowest temperature requisite to the removal of carbon, this loss in initial decolorizing power may be kept at a minimum.

In this connection, the curves given in Fig. 5 for the decolorization of Pennsylvania 180 neutral distillate are felt to be significant. These data are based upon operations in a refinery in which bauxite used for neutral percolation

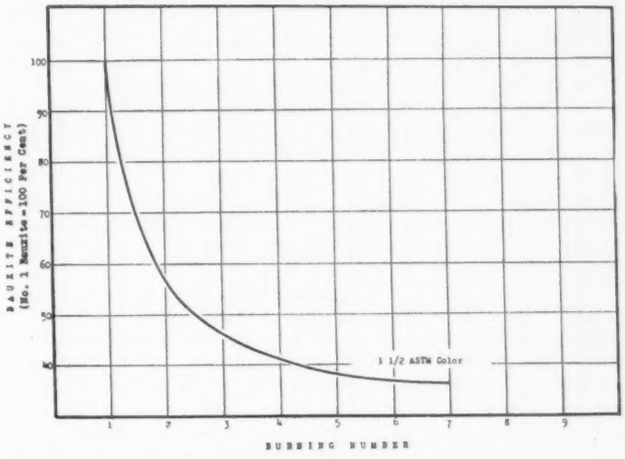

Fig. 6. A rapid efficiency loss is suffered by bauxite in the filtration of acid-treated Colombian distillate stock

TABLE 3

Bauxite Percolation of Pennsylvania and Colombian Distillate Stocks

Adsorbent	Bauxite (30- to 60-Mesh)								Extruded Fullers Earth (30- to 60-Mesh)		Bauxite (30- to 60-Mesh)				Extruded Fullers Earth (30- to 60-Mesh)
Percolation tests:															
Stock used	Pennsylvania Neutral Distillate										Colombian Distillate				
Gravity, deg. API	29.9										23.5				
Viscosity (Saybolt Universal) at 100 deg. F., sec.	185										109				
Color, ASTM	...										2½				
Filtering temperature, deg. F.	115										115				
Burning temperature, deg. F.	850		850-900		850-900		1,250-1,350		900		850	850-900	850-900	850-900	900
Adsorbent burning No.	1		5		9		20		1		1	2	3	7	1
Adsorbent density, lb. per cu. ft.	56.9		58.8		59.2		59.9		31.6		56.9	57.2	58.0	58.7	31.6
Finished viscosity oil color, ASTM	2	2½	2	2½	2	2½	2	2½	2	2½	1½	1½	1½	1½	1½
Viscosity oil yield:															
Barrels (42-gal.) per ton	25.3	39.3	15.5	27.5	11.6	22.4	7.3	17.3	47.1	73.5	9.2	5.3	4.3	3.4	18.7
Barrels (42-gal.) per 1,000 cu. ft.	720	1,115	456	809	343	663	219	518	745	1,160	262	152	125	102	295
Percolation efficiency, per cent:															
Weight basis	100	100	61	70	46	57	29	44	186	187	100	58	47	37	203
Volume basis (No. 1 bauxite equals 100 per cent)	100	100	63	73	48	60	31	47	103	104	100	58	48	39	113
Finished oil:															
Gravity, deg. API	...	30.6	...	30.6	...	30.6	...	30.5	...	30.5	...	...	...	...	...
Viscosity (Saybolt Universal) at 100 deg. F., sec.	...	178	...	180	...	179	...	180	...	180	...	...	...	...	...

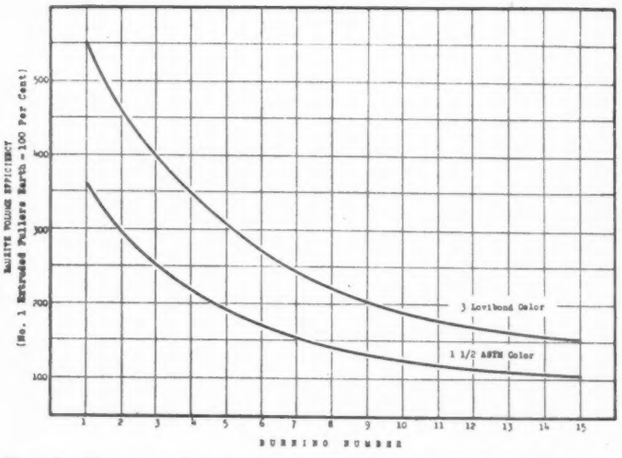

Fig. 7. The percolation of petrolatum is unquestionably the service in which bauxite shows the greatest advantage, inasmuch as the efficiency of this medium as compared to fullers earth frequently approaches 500 to 600 per cent by volume for new low-burned material

is maintained at the minimum practicable temperature (850° to 950° F.) through nine cycles, and thereafter burned at 1250° to 1350° F. and utilized for residual-stock filtration. The solid line from No. 1 to 9 and the dotted line from No. 10 to 30 represent the efficiencies which may be anticipated as a result of maintaining low temperatures of revivification. Under these conditions it will be observed that the curve levels off at a yield which is 55 per cent of the value of No. 1 bauxite—equivalent, on a volume basis, approximately to 55 to 60 per cent of new extruded fullers earth.

On the other hand, the solid curve from No. 10 to 20 represents actual efficiencies obtained from the later-numbered bauxites which had been subjected to the higher burning temperatures. It will be noted that, under these circumstances, the bauxite efficiency drops off to a value which is only 45 per cent of the new material. The corresponding curves at the lighter color show even lower values.

This difficulty in maintaining maximum yields of distillate stocks points toward the desirability of segregating different batches of material for this service—a procedure which can be readily effected, inasmuch as the average refiner segregates many different types of fullers earth in various stages. The maintenance of optimum yields, however, obviously demands more precise control of the burning operation than that required in residual-stock service—although economic studies based upon the efficiencies shown in Fig. 5 reveal that, at the maximum level indicated by the dotted curve, the employment of bauxite for the treatment of stocks of this type is justified provided segregation of low-burned material is accomplished. In many cases, for example, it is possible to utilize low-numbered bauxites for distillates, thereafter placing the material in residual-stock service.

From the standpoint of finished-oil quality, the chief point of significance rests in the improved odor of neutrals filtered through low-numbered bauxites. This characteristic likewise disappears subsequent to the first few revivifications. A number of oxidation tests have also shown a slight advantage for bauxite-filtered oils, as compared with fullers-earth percolation.

2. Percolation of Colombian Distillate

The curve in Fig. 6 represents the filtration of an acid-treated Colombian distillate stock, and demonstrates the rapid degree of efficiency loss suffered by bauxite in this service. The initial yield is definitely lower as compared with fullers earth than that characteristic of the Pennsylvania neutral, and the average yield obtained from late-numbered bauxites is very low—even under optimum conditions of re-burning. It will be observed that at No. 7 the curve reaches a value of only 37 per cent of No. 1—equivalent, on a volume basis, to only 35 to 40 per cent of new extruded fullers earth. (In view of this low value, the tests were not extended beyond No. 7.) The conclusion appears inescapable, therefore, that bauxite cannot be utilized to advantage on this type of stock, unless operations can be balanced in such a fashion as to permit the use of No. 1 and 2 only—thereafter utilizing the material in residual-stock filtration.

It should be pointed out that stocks of this type occasionally, after acid treatment and caustic neutralization, contain inorganic substances which are precipitated upon the filtering medium during the filtration process. These compounds exert a "poisoning" effect on the filtering material—experience with bauxite having shown that degradation occurs roughly in proportion to the amount of these compounds removed from the charge stock during percolation.

Conclusions relative to filtered-oil quality conform, in the case of this stock, to those derived from the decolorization of Pennsylvania 180 neutral (Table 3).

In view of the foregoing discussion, it is felt conclusive that, owing to the sensitivity of bauxite in the filtration of light distillates, the results to be anticipated in plant practice are much less predictable than those characteristic of residual-stock percolation. The results reported on the two stocks discussed probably approximate the extremes as regards bauxite effectiveness, inasmuch as experience has shown in this respect that solvent-treated distillates respond in a manner essentially similar to the Pennsylvania neutrals. The necessity for the maintenance of low temperatures of reburning for all stocks of this type is likewise felt to have been clearly established.

Petrolatum Filtration

The percolation of petrolatum is, unquestionably, the service in which bauxite shows to the greatest advantage, inasmuch as the efficiency of bauxite as compared to fullers earth frequently approaches 500 to 600 per cent by volume for new low-burned material. This fact is demonstrated by Fig. 7, which presents a curve of volume-basis efficiency (compared to extruded fullers earth) vs. burning number for a Pennsylvania petrolatum stock.

Here again is noted the necessity for the maintenance of low burning temperatures, optimum conditions of reburning having resulted in a final yield which is still in excess of extruded fullers earth on a volume basis. This, it is felt, demonstrates the unquestionable advantage held by bauxite in the percolation of petrolatum stocks and waxes, a superiority which becomes even more marked when cognizance is taken of the fact that the filtrations upon which Fig. 7 are based yield petrolatums which were sufficiently free of taste and odor so that further purification was unnecessary.

Summary

In summary, it may be stated that: 1, the average adsorptive efficiency of bauxite, both as compared with new material and with fullers earth, varies with the source and type of stock to be filtered and the method of filtration; 2, that, while fresh bauxite exerts a pronounced "solvent" action, this effect diminishes with continued revivification; and, 3, that improved gravity and carbon are obtainable with only the low-numbered bauxites, and only then at the sacrifice of viscosity.

Economic comparisons show bauxite to possess an unquestionable advantage over fullers earth in the decolorization of petrolatum stocks, residuals, and of distillate stocks—provided a balance is maintained whereby bauxite, in its early stages, is segregated for distillate filtration. The use of bauxite for paraffinic distillates exclusively has been shown to be a borderline case. The selection of adsorbent for a given service, therefore, remains an individual problem, and it is hoped that the data which have been presented herein will constitute a basis for the solution of such questions.

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[4] Ogden Fitzsimmons, "Fullers Earth and Bauxite-Type Adsorbents Compared," *Natl Petroleum News* **29** [24] 60 (1937).

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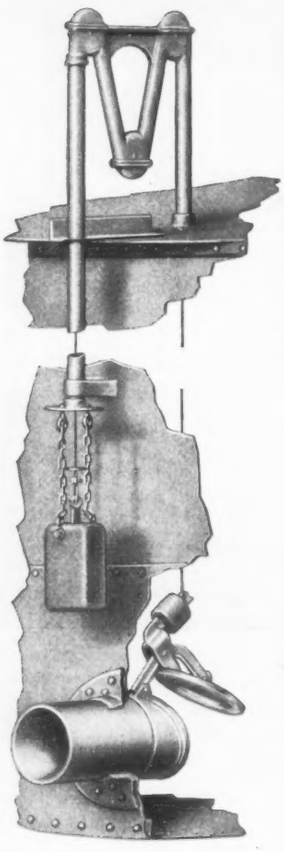

Figure S T—605

This valve has a disc mounted on a counterweighted arm and is held open by a cable attached to a fusible link outside the tank. The cable runs through a gas tight cable sheave case mounted on the tank roof, which obviates all difficulties associated with stuffing boxes.

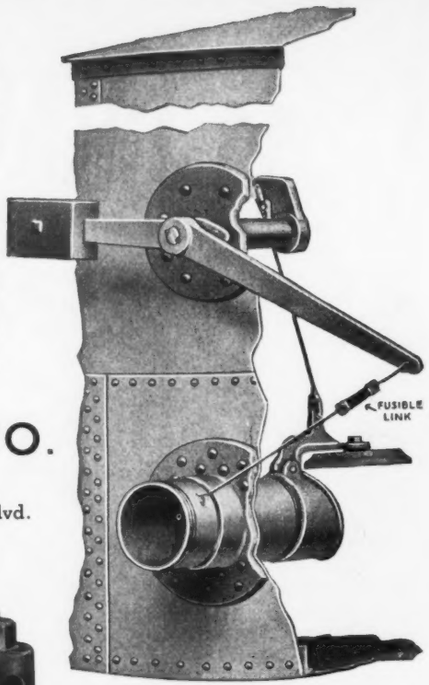

Figure S T—709

This internal safety valve has a valve disc mounted on a counterweighted arm which is held in the open position by a cable attached to a fusible link outside the tank and the melting of which releases the cable and closes the valve which is held tightly closed by head pressure. The stuffing box can be installed as closely as 18" above the valve for floating roof tanks and in the top shell plate above the liquid level of cone roof tanks.

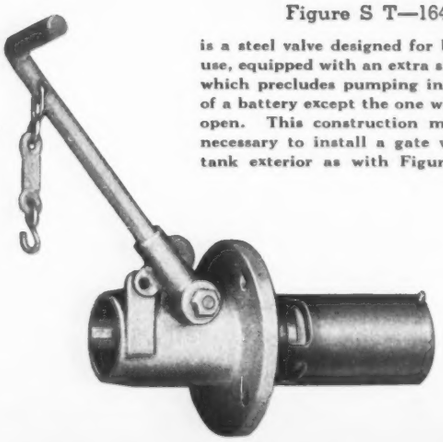

Figure S T—1640

is a steel valve designed for bulk station use, equipped with an extra strong spring which precludes pumping into any tank of a battery except the one whose valve is open. This construction makes it unnecessary to install a gate valve on the tank exterior as with Figure S T—885.

Figure S T—885

This is an all bronze spring loaded valve which screws into t he tank spud and is held open by a fusible link, the melting of which automatically closes the valve. Being spring loaded it provides for the relief of any thermal expansion in the lines back into the tank.

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Esso Laboratories of Standard Oil Development Co., collaborated with A. J. Blackwood and O. G. Lewis on a paper entitled "Anti-Knock and Mixture-Distribution Problem in the Multi-Cylinder Engine."

O. G. Lewis, Esso Laboratories of Standard Oil Development Co., collaborated with A. J. Blackwood and C. B. Kass on a paper entitled "Anti-knock and Mixture-Distribution Problem in the Multi-Cylinder Engine."

A. J. Blackwood, Esso Laboratories of Standard Oil Development Co., collaborated with O. G. Lewis and C. B. Kass on a paper entitled "Anti-knock and Mixture-Distribution Problem in the Multi-cylinder Engine."

Refining Technologists on A.P.I. Program

Charles M. Ridgway, development engineer for The Pure Oil Co., collaborated with L. M. Henderson and W. B. Ross on a paper entitled "Study of the Recovery of Oil from Spent Percolation Filters."

L. M. Henderson, supervising chemist and manager of the Northfield laboratory of The Pure Oil Co., collaborated with C. M. Ridgway and W. B. Ross on a paper entitled "Study of the Recovery of Oil from Spent Percolation Filters."

R. L. Rude, superintendent of the Toronto refinery of The British American Oil Co., Ltd., collaborated with R. D. Junkins and C. Barnes on a paper entitled "The Determination of Yield Per Pass, Time of Treatment, and In Situ Densities."

N. E. Loomis, vice president in charge of technical service departments for Standard Oil Development Co., is chairman of the A.P.I. Central Committee on Refinery Technology

Glenn Byers, assistant personnel manager and safety director of Shell Petroleum Corp., St. Louis, is chairman of the A.P.I. Committee on Accident Prevention in Refining

C. E. Townsend, Sun Oil Co., is chairman of the Committee on Fire Prevention in Refineries

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(Abstracts of Papers Presented at the Nineteenth Annual Meeting, American Petroleum Institute, Chicago, Nov. 14-18, 1938)

Oil Recovery in Filtration

Oil recovery from spent percolation filters is studied in an effort to reduce percolation costs in fullers earth type filters. C. M. Ridgway, L. M. Henderson, and W. B. Ross, The Pure Oil Co., Chicago.

The condition of the screen in percolation filters determines largely the rate of draining and the total amount of oil drained when using the fullers earth type of adsorbent. Recovery of oil remaining in a percolation filter after the adsorbent is spent is an important factor in percolation costs. Naphtha washing after draining was found to be the most practical wash.

In naphtha washing a low uniform washing rate is desirable. The slow rate avoids mixing when first added. The charging rate should be about that of the original filtration rate. The temperature of the naphtha affects the color of the cylinder stock recovered in the wash. Therefore the proper procedure is to use sufficient cold naphtha to replace the drainings and insure removal of a greater portion of the retained oil at or below the filtration temperature. Hot naphtha should then be used to assist in removing the balance of the oil and coloring matter.

The ideal wash naphtha would be one possessing a low vapor pressure to minimize handling loss and a low final boiling point to decrease naphtha retention by the clay during the steaming operation and to decrease the cost of separating the naphtha from the recovered oil. Practical considerations generally require the use of a single naphtha having a fairly low tolerance for tar and polymerization products and some control of solvent power comes from temperature variation.

An appreciable increase in the viscosity of the original charge increases the amount of naphtha necessary to reduce the oil content of the filter to a specific magnitude. In the case of bright stock it was observed that up to 15 barrels of naphtha per ton were insufficient to lower the oil content below 7.6 per cent. However, the major load at the average refinery filter plant is cylinder stocks and similar oils. For 85, 150, and 280 neutrals, from 10.3 to 11.6 barrels of naphtha per ton of clay was sufficient to reduce the oil content of the clay to 2.5 per cent.

The color of a cylinder stock recovered was found not indicative of its filterability. The filterability of the oil contained in the washings is at present the only criterion that can be used in judging the fraction to be returned to the blend tank for reprocessing. The color of the solution has been found to depend upon the concentration of the stock as well as the color of the oil. A plot of filter yield against wash cut number in barrels per ton shows the importance of controlling the amount of washings that are returned to the blend tanks for reprocessing. Clay-wash cylinder stock should not be blended with stocks of better filterability, inasmuch as this material decreases the filter yields to a much greater extent than its arithmetical proportion. When recycle wash is used, extreme care must be taken to avoid introducing into the system material of poor filterability.

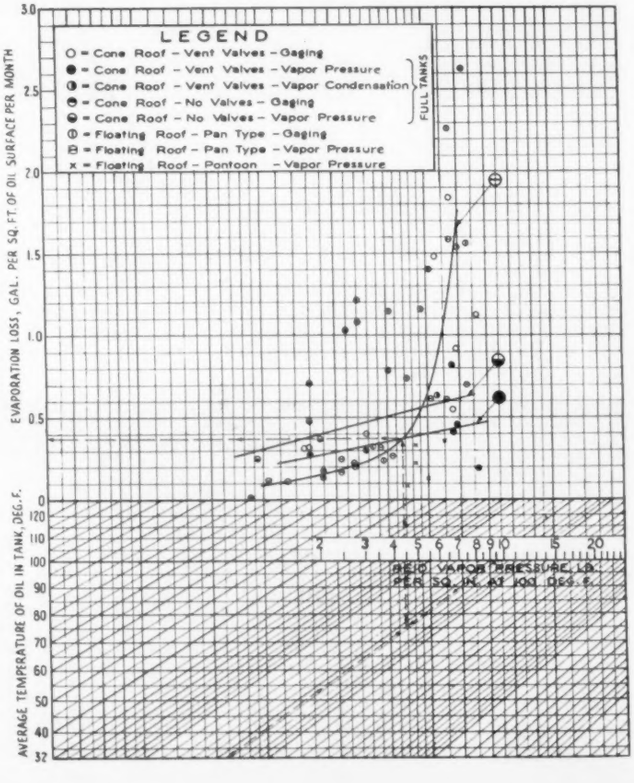
Chart to Predict Evaporation Losses

Storage tank evaporation losses can be predicted with reasonable accuracy by chart. Lack of comparable data prevents application to all types of tanks. C. C. Ashley, Shell Oil Co., San Francisco.

Two charts by which to predict evaporation losses in steel tanks have been prepared from rather meager data. Preparation of these charts showed that a large amount of data on evaporation losses published as comparable is not comparable and that there is a real need for the general adoption of a uniform procedure for conducting evaporation-loss tests. Such a standard method of test would facilitate co-ordination of results secured by different investigators.

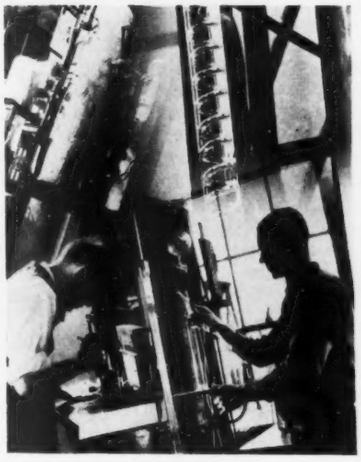
Methods involving the change of vapor pressure of an oil with a loss by evaporation appear to be the most desirable for the determination of losses. One basic assumption must be made: that the fractions evaporated in the laboratory are the same as those lost in the tanks under field conditions. The probable error is believed to be negligible. The method is that described at the 1930 meeting of the American Petroleum Institute by Chenicek and Whitman of Standard Oil Co. (Ind.).

Of the two quantitative methods, measurement of vapors lost and measurement of change of oil volume, the first has the serious defect that there can be little assurance that the tank is vapor tight and that all vapors are discharged at the point of measurement. Measurement of changes in oil volume are made by the


LEGEND
○ = Cone Roof – Vent Valves – Gaging
● = Cone Roof – Vent Valves – Vapor Pressure
◑ = Cone Roof – Vent Valves – Vapor Condensation
◓ = Cone Roof – No Valves – Gaging
◒ = Cone Roof – No Valves – Vapor Pressure
Ⓘ = Floating Roof – Pan Type – Gaging
⊟ = Floating Roof – Pan Type – Vapor Pressure
x = Floating Roof – Pontoon – Vapor Pressure
FULL TANKS
EVAPORATION LOSS, GAL. PER SQ. FT. OF OIL SURFACE PER MONTH
AVERAGE TEMPERATURE OF OIL IN TANK, DEG. F.
REID VAPOR PRESSURE, LB. PER SQ. IN. AT 100 DEG. F.

THE VALUE OF RESEARCH

Determining the amount of carbon in steel



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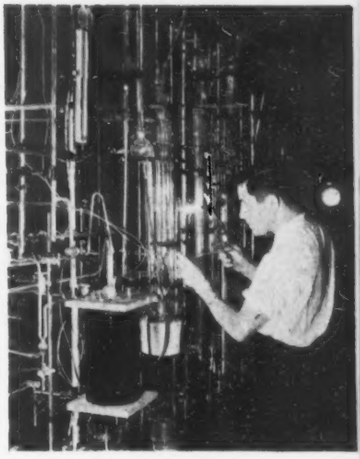

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customary gauging methods and are subject to all of the inaccuracies thereof.

Of two other qualitative test methods the one in which changes of distillation characteristics are determined was found lacking in inherent accuracy some years ago. Determination of change in composition of oil with respect to the most volatile fractions, as determined by Podbielniak analysis, is open to question inasmuch as it is assumed that there are no losses of the heavier fractions by evaporation.

Vapor pressure was chosen because it is the basic cause of evaporation; while correction to the oil temperature practically eliminates from consideration all variables of weather, tank size, and painting, by presenting a separate curve for each type of tank the variables of roof and vent construction, vent-valve pressure setting, and degree of filling (for cone-roof tanks) can be handled easily.

It is recognized that breathing losses depend on variation of temperature in the vapor space, largely due to solar radiation, but so does heat input to the oil. It is, therefore, believed and there is evidence to show that for normal average conditions the factor selected represents a logical basis of comparison.

The available data were inadequate to plot curves for all of the combinations of conditions listed on the chart. Three curves are shown from which the evaporation loss in gallons per square foot of oil surfaces per month may be determined as follows. The chart is entered with a reading of Reid vapor pressure, moving along the inclined guide lines (which are based on the Cox curves of vapor pressures) to an intersection with the proper horizontal temperature line, which corrects the vapor pressure to the temperature of the oil in the tank, and thence vertically to an intersection with the curve for the specific case in hand, reading the answer along the left margin of the chart. The dashed lines on the chart are an example.

In studying and criticizing these charts, it should be kept in mind that the data upon which they are based are derived from a large number of sources, among which there has been little or no co-ordination of test procedures or methods. The curves are believed to represent reasonable values but they are subject to revision as additional data may become available. None of the data available presented information on the effect of increased vent-valve pressure setting. All results are applicable to valve operating pressures of 1-1½ inches of water.

A suggested procedure for a uniform method for conduction tank-evaporation-loss tests is included as an appendix to the paper.

* * *

Engine Cylinder Differ In Octane Requirements

Variation in knocking characteristics of different cylinders of same engine increase cars' fuel anti-knock requirements. A. J. Blackwood, O. G. Lewis, and C. B. Kass, Standard Oil Development Co.

In an effort to discover why cars in apparently identical condition and adjustment should differ so widely in their anti-knock requirements, extensive studies of ignition-system characteristics showed that irregularity in distributor-cam contours caused differences in firing as much as 6 to 8 degrees among the cylinders of the test engine.

Studies of the octane-number requirement of individual cylinders showed that the actual spark advance to produce equal knock intensity in all the cylinders of the test engine varied by 15 degrees and if all cylinders were synchronized to have the same spark advance the octane-number requirements of the fuel to the various cylinders would still vary as much as 16 points.

It appears, therefore, that car manufacturers can reduce the average octane-number requirement of their cars several points by reducing the permissible maximum tolerance on distributor-cam firing angle. One manufacturer recently reduced his permissible tolerance from 3 to 2 degrees on the distributor, or from 6 to 4 degrees variation in spark advance. This is still excessive. Another means of reducing the requirement would be to adopt an assembly step in the ignition timing to insure that No. 1 cylinder is fired by that distributor cam lobe giving the greatest spark advance.

A novel arrangement was worked out to obtain information on the knocking tendency of the individual cylinders whereby a second ignition distributor is operated in parallel with the standard distributor. By this means the spark advance to one or more cylinders may be advanced or retarded without affecting the remainder.

With the particular test engine used, mixture distribution could be improved markedly only by going to excessively high fuel volatility. Preferential distribution was found to be principally quantitative and not qualitative. It appears that present-day cars are not capitalizing on the continued efforts of the petroleum industry to provide fuels of better volatility and higher octane number.

Care in assembling these cars at the factory could bring about an average decrease in octane-number requirement which could be utilized in future designs to permit higher compression ratio and increased efficiency.

* * *

Lubricant Fraction Analysis

Completion of analysis of the lubricant fraction of a Mid-Continent petroleum is summarized, its value appraised. F. D. Rossini, National Bureau of Standards.

The analysis with respect to size and type of molecules of both the "water-white" oil and the "extract" portions of the lubricant portion of a Mid-Continent petroleum has been completed. Every hydrocarbon in these two portions, which constitute about 57 per cent of the entire fraction, contains one or more naphthene rings, which is to say that there are no purely paraffinic or aromatic hydrocarbons in these portions. In the "wax" portion, which constitutes about 35 per cent of the lubricant fraction, the kind of molecules is known in a general way though much less definitely. In the "asphaltic" 8 per cent the kinds are surmised.

Taking the lubricant fraction as 100 per cent, the following approximate average analysis was found. About 43 to 51 per cent is composed of molecules with 1, 2, or 3 naphthene rings, together with the appropriate paraffin side chains. About 8.3 per cent is composed of molecules with 1, 2, or 3 naphthene rings and one aromatic ring, together with the appropriate paraffin side chains. About 8.1 per cent is composed of molecules with two naphthene rings and two naphthene rings and two aromatic rings (condensed) together with the appropriate paraffin side chains. About 6.6 per cent is composed of molecules with one naphthene ring and three aromatic rings (condensed) together with the appropriate paraffin side chains. About 18 to 26 per cent is composed of normal (straight-chain) paraffins, plus possiby some isoparaffins (branch-chain). About 8 per cent is composed of the "asphaltic" constituents which have not been investigated.

Current work is toward the separation of pure hydrocarbons from a large quantity of the dewaxed lubricant fraction of a second Mid-Continent petroleum. The "wax" and "asphaltic" portions mentioned above are now in storage but some further work on these portions undoubtedly would be desirable.

In connection with the technological and scientific applications which may be made of the information already gained, the following points may be considered. The knowledge obtained will aid in obtaining materials of special properties which can improve lubricants to meet the need for greater efficiency, higher speeds, and use of high pressures and high and low temperatures.

The results will aid also in synthetic production of lubricants and other oils, because the knowledge of what kinds of molecules are in lubricating oil from petroleum can help decide what molecules should be synthesized and because the knowledge of the method and extent of separation, and of the properties, will be useful in pro-

ducing "homogeneous" synthetic materials and in identifying the constituents.

The project of investigation of the lubricant fraction was undertaken following the decision of the American Petroleum Institute advisory committee in the fall of 1933 to extend the work then in progress on the gasoline fraction. At that time relatively little was known about the general constitution of the dewaxed lubricant fraction and practically nothing of the actual kinds of molecules in it. This broad survey of the chemical constitution of the lubricant fraction of petroleum, which was carried on as part of the work of the institute's Research Project 6 by B. J. Mair, assisted at various periods by S. T. Schicktanz, F. W. Rose, Jr., C. B. Willingham and A. J. Streiff, has now been completed. The magnitude of the investigation may be judged from the fact that it involved, in addition to the extensive processing of the material, the making of the approximate number of determinations of properties: 95 of molecular weight, 185 of carbon and hydrogen content, 75 of boiling point at 1 mm. mercury, 730 of density, 1500 of refractive index, 220 of refractive dispersion, 6400 of kinematic viscosity, 130 of aniline point, 15 of aromatic content by hydrogenation, and 95 of optical rotation.

* * *

Three Humble Promotions

Humble Oil & Refining Co. recently promoted the three men pictured here to new and more important positions. All of them have had long experience in the company's refining department.

Geo. P. Cuttin is promoted from the Ingleside refinery to the large plant at Baytown where he is supervisor of mechanical work, a new job created to better co-ordinate that department's work. He started with the company at Baytown as fireman on the old type cracking coils, became maintenance superintendent on the new cracking

Geo. P. Curtin W. H. Barber L. P. Salter

equipment in 1926, and was transferred to Ingleside as assistant superintendent of that plant in 1929.

W. H. Barber is transferred to the Ingleside refinery as assistant plant superintendent, from his old position as zone supervisor at Baytown. He started with Humble at Baytown as laboratory assistant in 1920, and has been successively acting chief chemist, assistant foreman and foreman, construction superintendent at Neches, superintendent at McCamey, and zone supervisor at Baytown about 1931.

L. P. Salter, formerly foreman of the machinist department, who succeeds Barber as zone supervisor at Baytown, began with the company as machinist in 1920. Promoted to assistant machinist foreman in 1923, he became foreman of that department in 1926, continuing in that position until his recent promotion.

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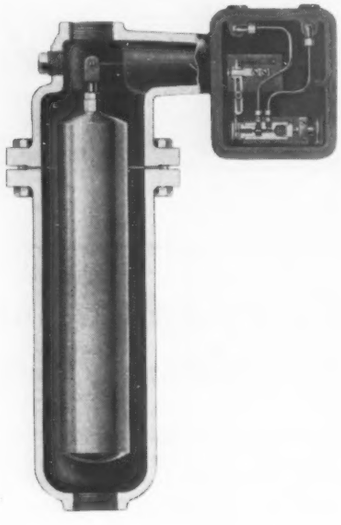
Activities OF EQUIPMENT MANUFACTURERS

LUBRICANT BULLETIN—The theory and application of non-oily yet unctuous graphite surfaces is presented by Acheson Colloids Corp., Port Huron, Mich., in Bulletin 220.4. The bulletin tells the how and why of the graphoid surface. Folder 626, also available, covers the treatment of screw threads with colloidal graphite to aid tightening, reduce galling, minimize corrosion and ease later removal in thread assemblies.

* * *

LEVEL CONTROL—A new and more efficient long range liquid level controller, the Type 246 Level-Trol, has been developed by the Fisher Governor Co., Marshalltown, Ia. It is a pneumatic type designed to maintain an unusually sensitive, throttling level control in towers, accumulators, reboilers and side strippers.

While this new control can be used on liquids of all gravities, it is especially suited for high viscosity oils. The principle of operation is based on weight measurement of buoyancy rather than a float riding a moving level. All lost motion is eliminated from the float mechanism, it



is said. An anchored cantilever spring supports the float, which is specially weighted to sink in the liquid being handled.

As the liquid rises, that displaced by the float creates a buoyancy which partially relieves the cantilever spring. As the spring returns toward its normal position, this action is transmitted to the pilot valve by an arm that contacts the spring through a small rotary stem. Fisher engineers state that a level change as small as 1/32 inch will register a pressure change at the diaphragm.

Two sizes are available: one with a 14-inch adjustable level change, the other with a 32-inch adjustable level change. Catalog F contains complete information.

* * *

A new department of Clark Bros. Co., Olean, N. Y., will be the Technical Service Division, it is announced by Vice-President J. B. O'Connor. This department will correlate the field and shop engineering and have charge of process design. F. W. Laverty will be in charge.

* * *

INCORPORATES—The firm of Parkhill-Wade, a consulting and construction engineer partnership formed in 1932 in Los Angeles, has been incorporated with no change in the organization, its personnel or policies, it is announced. The firm is well known in California as designers and constructors of natural gasoline plants, repressuring and pressure maintenance units, butane standby and butane production plants and gas dehydration units. The board of directors includes Henry N. Wade, president, C. L. Parkhill, vice president, and Roy Lacy. The firm collaborates in the Mid-Continent with the Stearns-Roger Mfg. Co. of Denver.

* * *

INSTRUMENTS—A new 7-page bulletin (No. 227) published by The Foxboro Co., Foxboro, Mass., describes a new pneumatic transmission system for remote measurement and control of flow, temperature, level and pressure. The operating principle is said to be extremely simple. A control instrument with 100% uniform throttling range will change the air pressure on a controlled valve, in direct relation to the position of the measuring element.

If a pressure gauge is installed on the line in place of the controlled valve, the air pressure can be measured and will be a direct function of the pen deflection if the throttling range in the control instrument is uniform, it is said.

* * *

GASOLINE TRAP—A new bulletin (938) covering the Nicholson Gasoline Special trap is announced by W. H. Nicholson & Co., Wilkes-Barre, Pa. The trap is designed for pressures up to 650 pounds.

Gas Flame Extinction By Steam Studied

CLEVELAND, Nov. 16.—Extinction of flames of hydrogen, carbon monoxide, methane, benzene vapor, coal gas, and producer gas by increasing proportions of steam has been experimentally studied by J. S. Yeaw and Louis Shnidman, of the Rochester Gas & Electric Corp.

"Steam was found to be equivalent to and in some instances superior to the inert carbon dioxide in its quenching effect on flame propagation," it is stated. Nitrogen was found much weaker in this respect than either steam or carbon dioxide.

A paper by these authors describing the experiments in a spherical 350 cc. glass explosion pipet and including tables and charts showing the general information necessary for the proper treatment of any mixture to prevent explosion hazards was presented at a convention of the American Gas Assn. in Atlantic City, Oct. 10-14.

Glyptal Resins Used In Lubricants

CLEVELAND, Nov. 12.—A new use for resins, and a new intermediate for manufacture of lubricants is the practice now being developed of using glyptal resins in the preparation of certain types of lubricating media. As much as 10% of these resins is used in some special lubricants where high film strength is needed, reports say.

Glyptal resins are made by the interaction of glycerine and phthalic acid or anhydride, variations in manufacture producing wide differences in the properties of the product, chemists say. A large quantity of these resins is being made for various purposes, the making of protective coatings in 1935 calling for the use of 33,000,000 pounds of these materials.

Will Oil Be Santa To Town of Santa Claus?

AN OIL derrick with its drilling crew in prosaic working clothes is likely to usurp during the coming Holiday season the attention usually bestowed upon the more symbolical Kris Kringle by the folks at Santa Claus, Ind.

This cross-roads town in Spencer county has for forty years or more based its annual claim to fame upon the fact that a huge volume of Christmas mail each year was shipped to its postmaster to be remailed to give the recipient the added thrill of a package with a Santa Claus postmark.

Three years ago the people of Santa Claus began to dream visions of seeing their town grow to perpetual fame by becoming the toy manufacturing headquarters of the country, with fine factories, tourist camps, hotels and homes. That was when two promoters hit the town and began to talk up their projects to buy and lease real estate. Excitement ran high when a huge granite statue of the children's idea of Santa Claus was erected in what was planned to be a large Santa Claus park dedicated to the children of the world.

The rival promoters, however, snarled their projects in a law suit and the new enterprise languished. Gloom settled over Santa Claus, and there was feeling even between the citizens of the little community over the likely outcome of the litigation.

Then, a few months ago, seismograph crews for some of the large oil companies which have been prospecting in Kentucky followed a fault line across the Ohio river into Spencer county. In their wake came leasing agents who took blocks of acreage. Leasing prices, while only 50 cents to $2 an acre, were still sufficiently interesting to bring hope to Santa Claus again. The hope became stronger when it was announced a local promter was to drill a well there.

The promoter even talked of having the well finished by Christmas.

Checker-board leases have been executed in the most promising sections which trail above the Birk City fault from Santa Claus northeast to St. Meinrad, Ind., from Santa Claus north to Ferdinand, Ind., from Santa Claus southwest to Dale, Lincoln City and Gentryville, and south to Newtonville, Richland and Hatfield.

Some of these areas were tested years ago and small production found at shallow depth. None of those tests, however, were over 1000 feet.

Spencer county is almost due north across the Ohio river from the fields around Owensboro, Ky. And within Spencer county there have been two or three small pools developed. North and northwest of Spencer county, up around Princeton, Ind. there has been considerable development.

Now several of the major oil companies, along with a few independent operators, have gotten into the play around Santa Claus. The report prevails that oil in paying quantities is possible at greater depths than had been reached in previous ventures.

It is little wonder, therefore, that the town's 67 inhabitants and the tobacco growers and the landowners generally in the surrounding countryside now are dreaming of riches from oil.

They have all but forgotten the litigation over the exploration of their community as a toy and tourist headquarters. That litigation, however, may become a far more important factor in their dreams than one would imagine.

One of the promoters bought a town lot on which is located the Santa Claus Inn. The former owner had made a previous lease agreement with the other promoter.

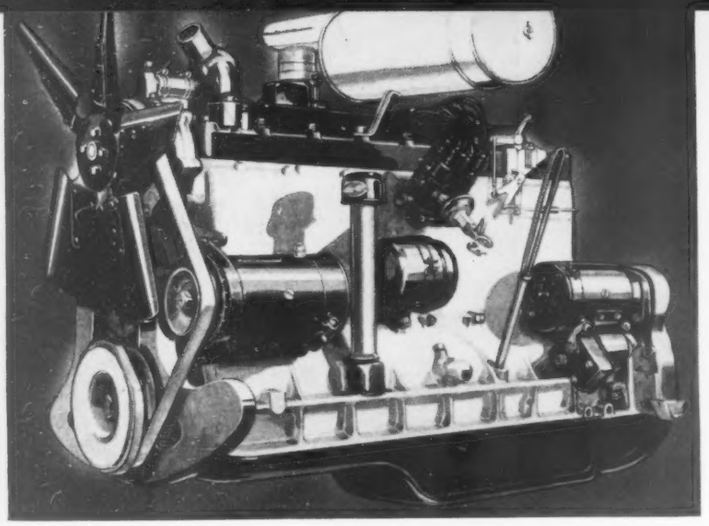
As a stockholder in his rival's venture, the new property owner-promoter wanted to know what were his chances for profits, and why his unprofitable lease should not be terminated—for after all there had not been much profit to date in the promotional activities.

Decided in favor of the first promoter, the suit is likely to have the effect of opening the town and surrounding area to competitive development through individual enterprise, for oil and other lines as well. If the second promoter should win, it is indicated control for commercial exploitation over Santa Claus and the surrounding area within half a mile will be tightened. For that promoter holds leases of 25 years duration which permits carrying on enterprises only which have to do with the seasonal and legendary work of Santa Claus.

Further law suits might be necessary to clear the way for the landowners to reap the full benefit of any oil production that might be developed.

Meanwhile preparations are going forward again at the combination general store, post office and service station for a new record Christmas mailing this holiday season.

The postoffice in Santa Claus, Ind., whose residents hope the town will also come to the public's attention through oil developments in nearby territory. The postoffice is in the general store and Mrs. J. F. Martin runs the store and the gasoline pump in front



Eight-cylinder engine of the 1939 Chrysler imperial, developing 135 horsepower; bore is 3¼ inches and stroke 4⅞ inches, piston displacement 323.5 cubic inches. This engine has a 6.8 to 1 compression ratio

Motor Fuel Demands Of Modern Engines

By W. W. Scheumann

THE far reaching changes in the characteristics of motor fuels which have been made in the past several years by refiners, have been in order that full advantage could be taken by the public of the improved engine performance resuling from higher compression ratios, higher speeds and the increased number of cylinders.

The important changes made have affected principally the molecular structure of the fuel itself, to eliminate the tendency of the fuel to "knock," and its volatility, to improve the easy-starting and accelerating qualities of the motor fuel.

As the compression ratio and power output of the automobile engine increased, the difference between fuels suitable and unsuitable for its operation became steadily more apparent.

These points as to changes in automobile engines and the resulting effect on the characteristics of motor fuels were discussed by W. W. Scheumann of Tulsa, technologist for Cities Service Oil Co., before a group technical meeting of the Western Petroleum Refiners Association at Shreveport recently.

The car makers have achieved their aims, in part at least, he stated, by building engines of smaller size, but which operate at higher speeds and higher compression pressures to produce greater power output, show better performance characteristics and give higher thermal efficiency.

Scheumann showed how engine weight per maximum brake horsepower, for two typical, popular priced cars, had decreased from 10.5 to 11 pounds in 1928 to about 6.5 pounds at present.

The average maximum brake horsepower has increased from about 65 in 1927 to over 110 at present, he stated. There has been a corresponding increase in compression ratios, as shown on an accompanying chart, and in engine speeds, which have increased from an average maximum revolutions per minute of about 2750 in 1927 to nearly 3600 at present, which explain how the increased power output has been achieved, Scheumann stated.

The increase in the average brake mean effective pressure, from about 74 pounds per square inch in 1927 to about 92 at present, he stated, indicates more correctly the higher average cylinder pressures encountered in modern automobile engines than does the compression ratio increase, as it includes such factors as valve timing, volumetric efficiency and other engine design factors which relate to the absolute pressures during operation.

Another factor which is partly responsible for the improved smoothness in operation of the modern automobile engine, Scheumann stated, was the use of an increased number of cylinders. An accompanying table shows the extent to which this change in engine design has occurred.

The principal portion of Scheumann's paper discussing the improved characteristics of motor fuels and how they have been achieved is published herewith. The simple terms in which the subject is discussed make it of value to the layman. The portion of his talk in which the changes in the engines themselves are discussed has been omitted.

If a given gasoline were burned in a series of engines of increasing compression ratio or increasing compression pressure, it would be noticed that, in general, the amount of detonation or knocking increases with the higher compression pressures. Therefore, the steady increase of compression pressures in the automobile engine has demanded a corresponding increase in the ability of the fuel to resist detonation.

This property of motor fuels is expressed in terms of octane numbers. The octane number being the per cent of iso-octane (2,2,4 trimethyl pentane) in a blend with normal heptane, which has the same knocking characteristics as the fuel in question, when tested in accordance with a specified procedure on a specified test engine.

This test has been in general use only since about 1931 and has undergone several modifications since that time. Actual averages are, therefore, not available; however, Brown has estimated the average values from 1927 to 1935, and additional values have been secured from surveys of motor fuels marketed. An accompanying figure is an estimated curve showing the increase in the average octane number of regular or housebrand fuels over a ten-year period.

In 1928 it is estimated the average octane number of housebrand gasoline was 51, while today it is approximately 71 (American Society for Testing Materials methods). This represents a tremendous change in the character of such gasolines and, judging from available data, the trend of engine compression pressure is still upward, which means a corresponding continuation of the octane number increase.

However, the refiners' problem is vastly more complicated than appears on the surface. Simply increasing the octane number is only a partial solution of the problem of supplying satisfactory fuels for modern engines. In any line of endeavor a constant standard of comparison capable of satisfactory gradation is necessary if the progress made is to be quantitatively determined. The octane number scale has been the refiners' standard for measuring the improvement in, and establishing the anti-knock characteristics of his fuels. Paradoxically, however, the octane number lacks considerable of being a true standard for such use.

The ultimate value of motor fuel is

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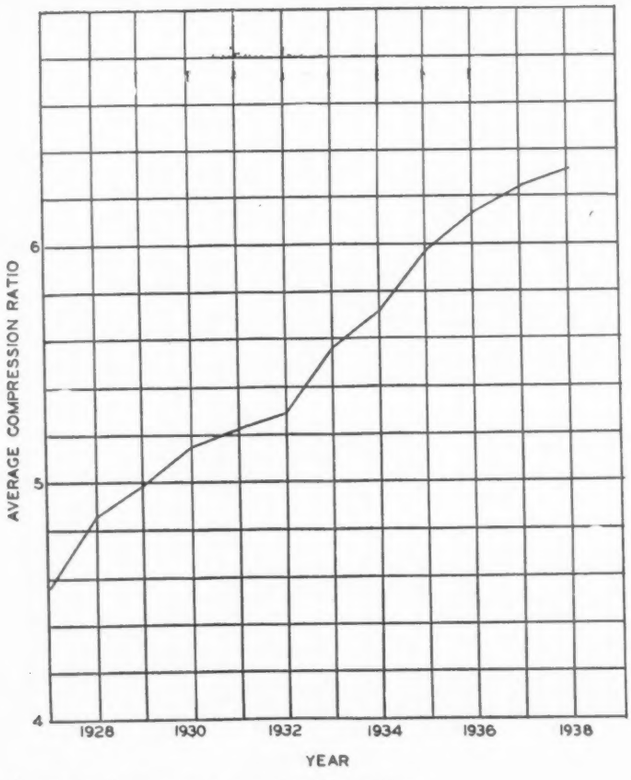
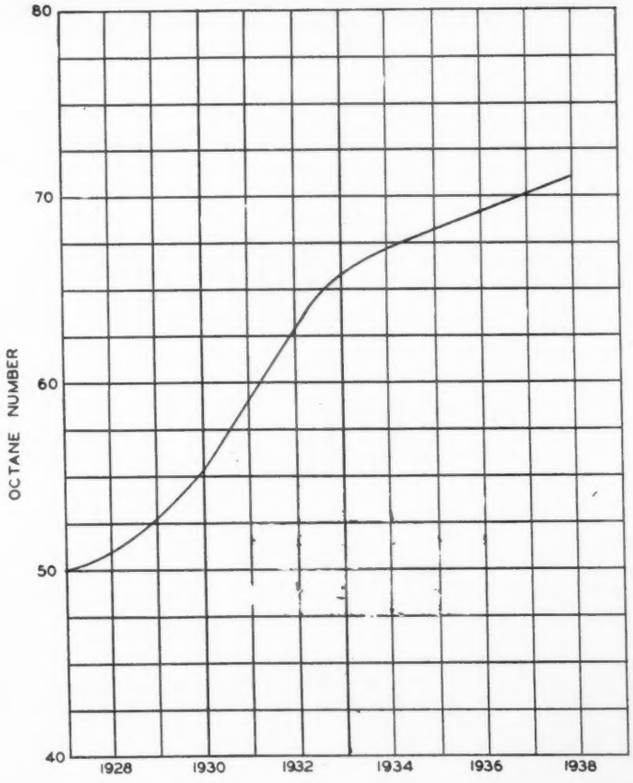


Increase in average compression ratios of automobile engines during the past ten years



Increase in octane numbers of house-brand motor fuels (estimated average) for past ten years

determined by its behavior in actual service. This criterion is, however, so very complex that it can only be considered in terms of generalities, and can be used by the refiner only to a very limited extent. Under the guidance of the co-operative Fuel Research Committee, five extensive test programs have been carried out for the purpose of correlating laboratory octane numbers with road performance. These have all shown that in many cases, wide divergence may be expected not only between cars of different makes and models, but between different cars of the same make and model.

WHEN we consider that the severity of detonation of fuels in an automobile in the hands of an average driver is judged (1) by his objection to the sound produced (and this may vary greatly with the individual) and that it also depends upon (2) fuel factors such as the inherent anti-knock quality of the gasoline, (3) engine factors, such as compression ratio, spark advance, manifold design, carbon accumulation, etc., and (4) operating factors such as speed, road grade, atmospheric temperature, humidity, and others, it seems very problematical if any laboratory method can ever be devised which will be a precise index of fuel anti-knock performance in the automobile. The refiner is therefore handicapped by the fact that his guide and accepted quality standard lacks accurate significance.

Vast amounts of research and development work have been directed toward the solution of the anti-knock problem. In general, the refiner is using two methods for the production of such fuels, namely (1) the addition of tetraethyl of lead to his gasoline and (2) the production of gasolines containing hydrocarbons whose chemical structure is such that they possess high auto-ignition temperatures, and low rates of reaction increase with temperature, the requisites of high natural resistance to detonation.

The use of tetraethyl lead for octane number improvement of gasoline is now so widespread it practically constitutes standard practice. A conservative estimate indicates that at least 75 per cent of the gasoline sold today contains this anti-knock agent in concentrations of from 0.1 to 3 cc. per gallon. Originally fuels treated with tetraethyl of lead were only sold as premium grade fuel; however, since 1933 it has also been a constituent of house-brand or regular grade gasolines.

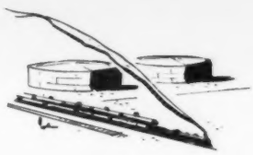
In spite of the fact that, as the use of tetraethyl lead increased, it has been manufactured at lowered costs and that such savings have in large measure been passed on to the refiner, the addition of this agent to motor fuel represents a very large expense item. The refiner, therefore, has had to study the factors involved in the use of lead tetraethyl, and has recognized the importance of lead susceptibility and lead response in his fuels, and has had to control refining operations with these factors in mind. A recent development along this line is the recognition that sulfur and sulfur compounds such as di-sulfides in gasoline lower the lead response and established treating methods have undergone many revisions in order to eliminate undesirable sulfur or sulfur compounds.

The successful use of lead tetraethyl has therefore demanded more from the refiner than the simple addition of this compound to his product, as it has been necessary that he prepare his base fuel so as to use this reagent most effectively.

IN ADDITION to the use of lead, the refiner has also found that the anti-knock characteristics of the base fuel previous to lead addition play an important part in the road performance of his product. While road tests have not developed a precise relationship in this connection, there does appear to be a definite trend indicative of better performance from fuels of a given octane number made by adding a small amount of lead to a relatively high octane number base fuel, as contrasted with a fuel of the same octane number made by adding a large amount of lead to a relatively low octane number base fuel.

Recognition of this has in part been responsible for the tremendous increase in cracking and reforming operations, since the gasoline made by this method has a natural high octane number as contrasted with the low octane number of most straight-run gasoline. An accompanying chart indicates the yearly production of motor fuel constituents in the U. S. and it is very significant to note that in 1927 these constituents were produced

HIDDEN SAVINGS



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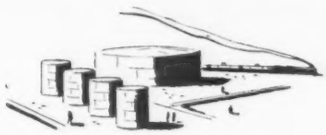

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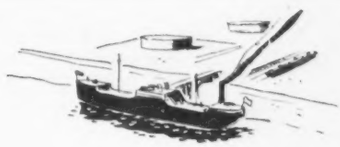
50%



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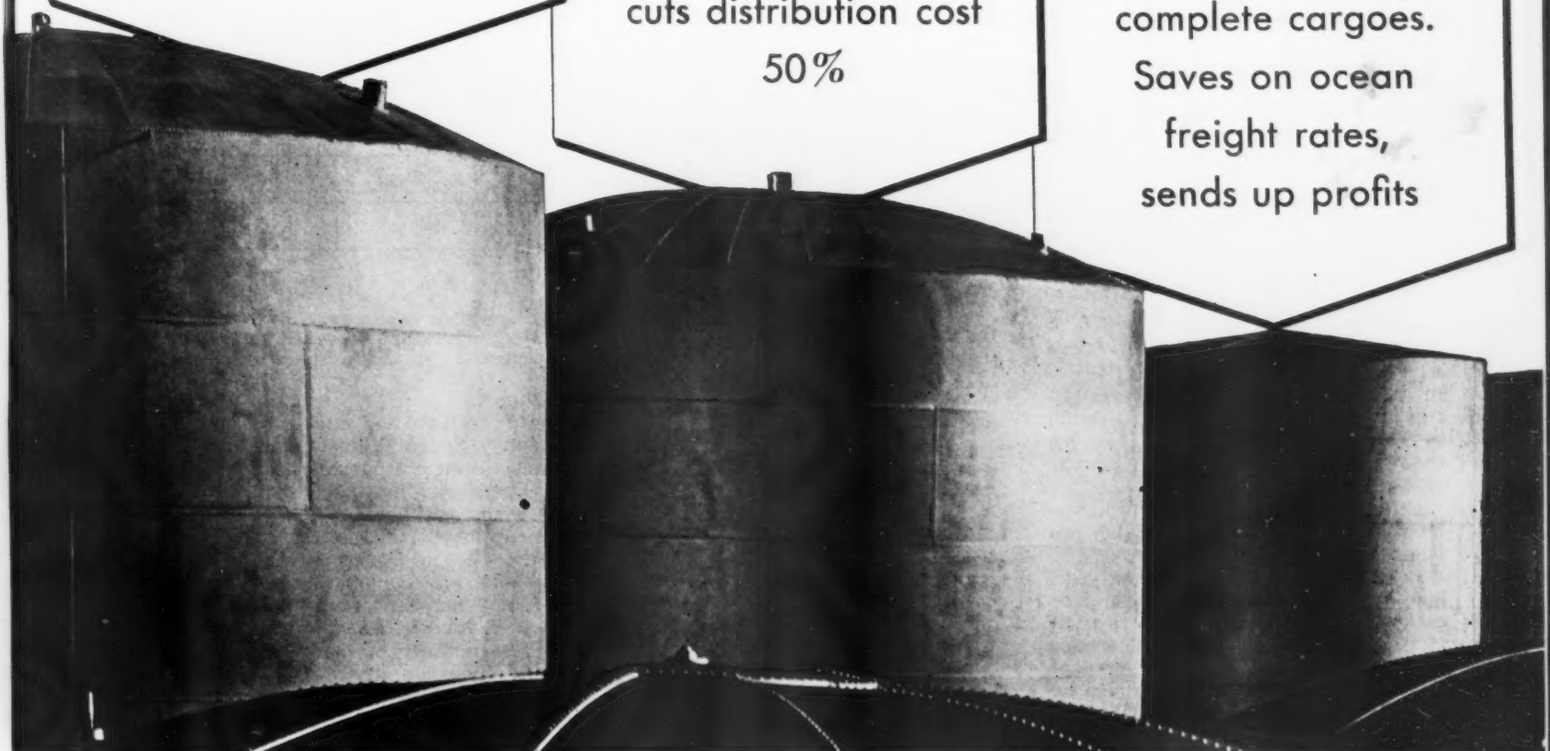
freight rates,
sends up profits



Every General American tank is more than just "a place for storage." It means scientific protection for your commodity --- safety from contamination, from fire and evaporation. It means modern economy --- cutting investment and handling costs. It is part of a great terminal system with every facility for speeding your shipments. Leading American industries use General American terminals to put them ahead of competition. We believe it will pay you to use them too.

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A DIVISION OF GENERAL AMERICAN TRANSPORTATION CORPORATION

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Galena Park, Tex. (Port of Houston)
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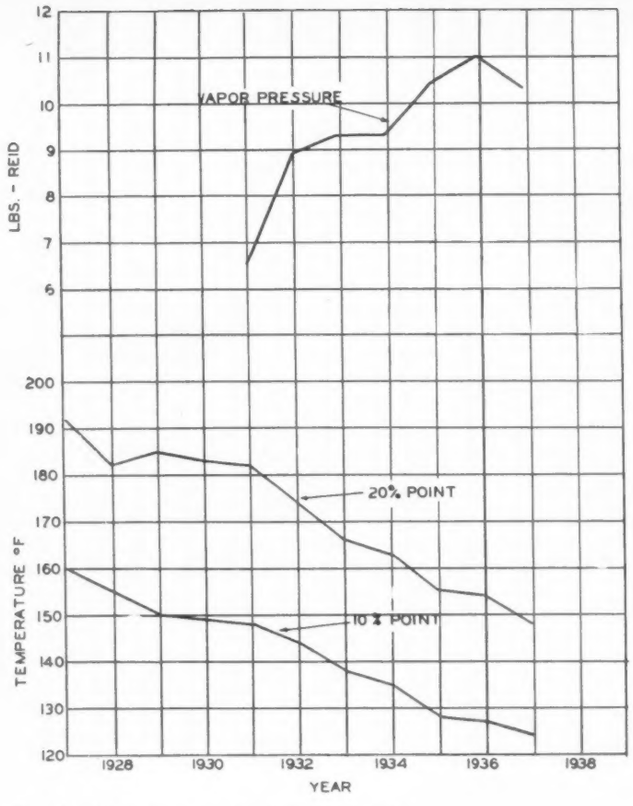
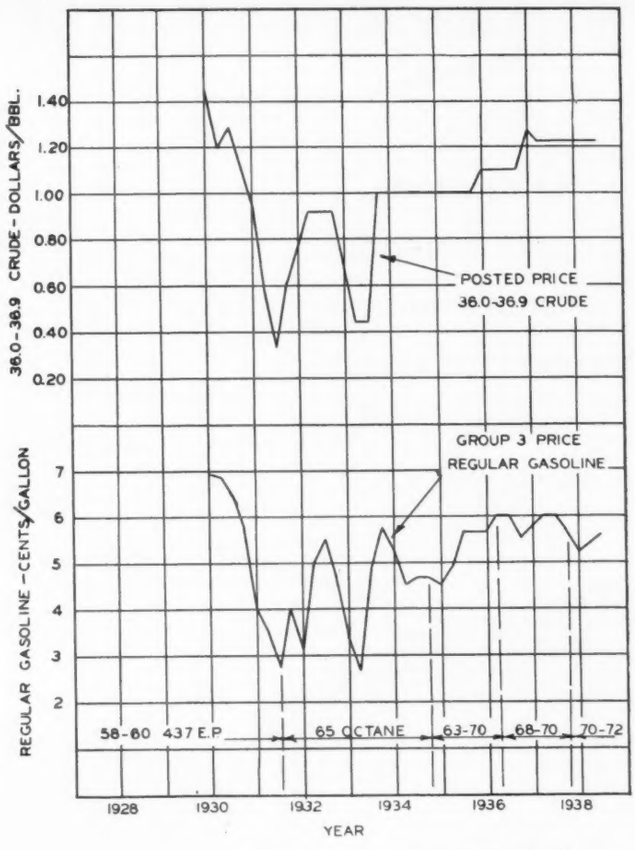


Trend of increase in front end volatility and trend in vapor pressure of regular grade gasoline as of Jan. 1 for past ten years



Comparative price trends of 36-36.9 gravity Mid-Continent crude oil and regular gasoline at Group Three refineries

in the ratio of 57.6 per cent straight-run and 33.3 per cent cracked, while in 1937 there was produced 45.0 per cent straight-run and 47.9 per cent of cracked gasoline.

Cracking and reforming processes have been vastly improved and produce motor fuel of much better quality today than they did ten years ago. However, research on these processes must continue as they are by far the major factors for consideration in future motor fuel development. Other processes, however, are also being developed which will assist in raising the octane number of base fuels. Most noteworthy of these at the present time is polymerization.

THIS produces a high octane number gasoline from cracking still gases, or when combined with cracking or dehydrogenation of natural gas, will convert a portion of the latter to high octane motor fuel. Commercial utilization of this process is only several years old; however, it was recently estimated, that polymerization plants now operating or under construction have an annual capacity of 10,500,000 barrels of 76-100 octane number gasoline.

Other processes such as alkylation of low boiling iso-paraffins and olefins, isomerization of straight-chain paraffins to either iso-paraffins or cyclic hydrocarbons, combinations of hydrogenation or dehydrogenation with alkylation or polymerization are being studied and developed. Undoubtedly, the near future will see commercial installations for the production of high octane number gasolines by such methods. The importance of higher octane number base fuels has given great incentive to research and development work for the economic production of synthetic hydrocarbons which will impart this property, and which is becoming increasingly necessary with the continuation of present trends.

The importance of adequate volatility of motor fuels is well established. This property not only controls starting ability and operation during the warming up period, but is also related to fuel distribution to the cylinders, and therefore effects economy, acceleration, knocking and other features after the engine has reached operating temperatures. The importance of this has been demonstrated by numerous investigators and partially as a result, the volatility of motor fuels has shown a progressive increase.

This increase in volatility has not been demanded entirely by automotive design. Instead, it has more or less been fostered by the petroleum industry. Several fundamental reasons have been responsible for this. Increased cracking and reforming, more efficient rectification and butane recovery have made increased volatility from the utilization of light hydrocarbons an economic necessity. High octane number requirements have been a further reason, since the high octane number of the butanes makes their inclusion desirable. Notable research has been carried out by Brown, Eisinger and Barnard, and others showing that increased volatility, if properly utilized, is a desirable feature.

INCREASED volatility permits a more uniform mixture to reach all cylinders of the engine, resulting in better anti-knock performance and better economy. The increase in the average number of cylinders in the engine demands, therefor, a more volatile gasoline. Lower manifold temperatures can be used with more volatile fuels,

Table No. 1—Classification of Automobile Engines by Number of Cylinders

	Per Cent			
Year	Four	Six	Eight	Twelve and More
1927	49.7	47.1	3.2	..
1928	50.7	45.0	4.3	..
1929	40.7	54.3	5.0	..
1930	44.5	43.6	11.8	0.1
1931	33.3	52.0	14.5	0.2
1932	17.9	50.4	31.1	0.6
1933	3.2	61.8	34.7	0.3
1934	1.2	59.8	38.8	0.2
1935	0.5	59 6	39.4	0.2
1936	0.5	66.5	32.4	0.6
1937	1.5	63.5	34.2	0.8

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Cities Service Oil Company supplies every petroleum need—Offers dealers a complete line of quality products and proved-for-profit services

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New York	Fort Worth
Cedar Rapids	Tulsa
Boston	Milwaukee
St. Paul	Cleveland
Grand Forks	Detroit

CITIES SERVICE OIL COMPANY, LIMITED
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ARKANSAS FUEL OIL COMPANY
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OIL is our business—every phase of it—Production, Refining, Transportation and Distribution. Behind the activities of our 7 giant refineries is a history of 75 years experience. Small wonder that today the rich resources and facilities behind Cities Service products provide the basic merchandising methods for 16,000 outlets in 38 states.

Cities Service products—diverse, dependable and profitable—have won the wide public acceptance they deserve. But quality products of immense popularity are only part of the story. Exclusive Cities Service equipment gives dealers the advantage of offering exclusive services. Your sales efforts are supported by expert company cooperation.

The only national full hour radio program in the industry—The Cities Service Concert—entertains millions every Friday night—influences them to buy the products you sell.

When you sign up to sell Cities Service products, you're set to build a money-making business. Get *all* the facts today.

OILS AND GASOLENES

Listen in every Friday Evening at 8 o'clock (E. S. T.), to the Cities Service Radio Concert—WEAF and 14 associated NBC stations.

and it has been shown that a decrease of 15 to 20° in the intake manifold temperature is equivalent to an increase of one octane number in the fuel.

Automotive engineers have taken advantage of this and manifold temperatures have been reduced. Late data on this are not available: however, Campbell, Lovell, and Boyce have shown that from 1931 to 1934, average intake manifold temperatures were reduced 30°, and that the tendency was toward further reduction. Satisfactory performance from automatic chokes, heating devices, etc., makes it necessary that they be adjusted for a certain expected volatility. The volatility trend has been recognized by the automotive industry and the modern car is therefore adjusted for best operation on volatile fuel.

The chief factor limiting fuel volatility has been the tendency of cars toward vapor lock. Early work on this problem indicated that vapor lock was related to both fuel and automobile factors. Vapor pressure is apparently the chief fuel factor, and the amount of heat radiated to the gasoline feed lines, and their vapor handling capacity the principal automobile factors. Progress has been made in automotive design toward the improvement of these latter two factors, in order to permit the use of higher vapor pressure fuels. However, many individuals have been of the opinion that this progress has been very slow.

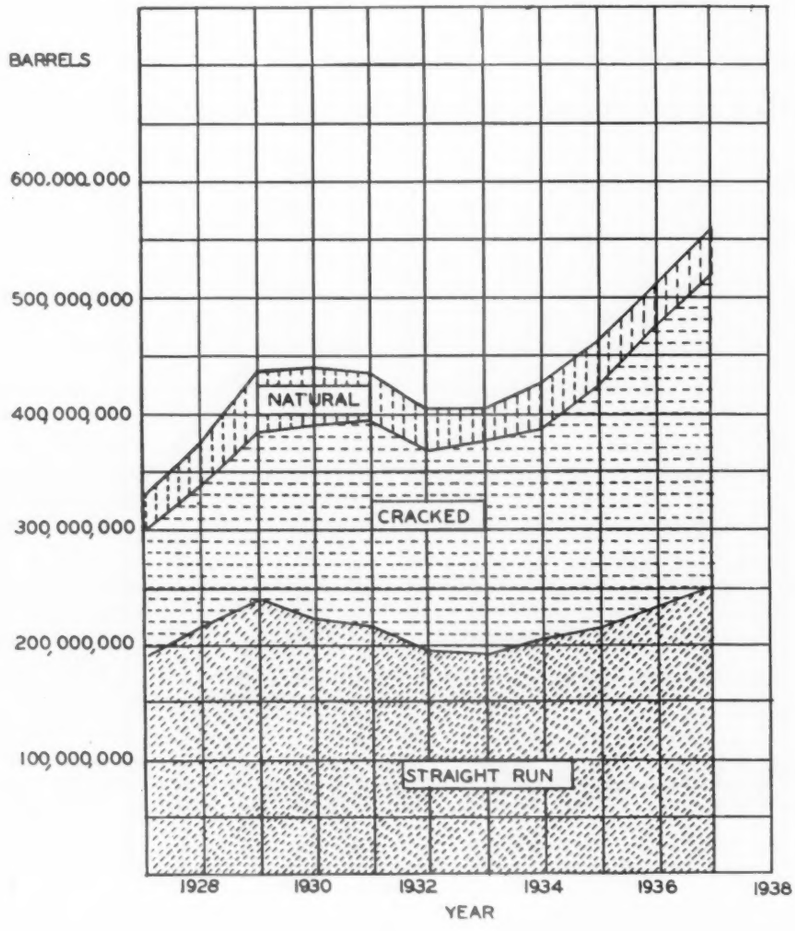
As a result, there was conducted last year, under the jint auspices of the Natural Gasoline Association of America and the Western Petroleum Refiners Association a road test program, known as the Pawhuska Road Tests, for purposes of studying the fuel systems of representative 1937 cars. It was found that wide differences exist in this respect.

In order to produce cars which could utilize more volatile fuel, some manufacturers have built fuel systems so arranged that a minimum amount of heat is radiated to them. Others, however, have depended largely on the vapor handling capacity of the fuel system, and the vented carburetor, which vents any fuel vaporized in the feed lines to the atmosphere. It was found that, while this latter system assists in eliminating vapor lock, it wastes considerable amounts of fuel. Moreover, the fuel vented is made up of the most volatile constituents, having a high octane number, and therefore the engine is actually operated on a lower octane number, poorer volatility fuel. Over-all fuel losses, including the loss from the rear tank, were found to be, on some cars, as high as 4 per cent and over, depending upon the type of driving.

Just how much of this fuel and octane number loss has been eliminated in later models, is not known. However, the carburetor design of one 1939 model has been called to the writer's attention. In it the carburetor vents into the air filter, so that any fuel vented from the carburetor is recycled with the incoming air and loss prevented thereby.

From an over-all viewpoint, it is therefore necessary that, in order to make satisfactory motor fuel, the refiner of today must produce a base gasoline not only by the skimming of crude, but also by extensive cracking, polymerization, and other methods in order to produce a base gasoline of high natural octane number. To this, sufficient tetraethyl lead must be added to meet accepted sales quality standards. In addition, the fuel must also meet accepted volatility requirements. The trend in these demands shows little let-up of increasing severity and the successful accomplishment of these objectives demands that the refiner carry out continuous research work of a very wide scope and continuously modernize his equipment and manufacturing methods in accordance, in order to maintain his position.

All of these operations involve added expenses, which normally should be reflected in gasoline prices. This has not been the case, however, and, while the modern engine can hardly be blamed for the refiner's failure to secure an adequate return for the improvements he has made in motor fuels, nevertheless this unsatisfactory economic condition greatly adds to the refiner's burden.



Production of various motor fuel constituents since 1928, showing the large increase in the volume produced by cracking

AN ACCOMPANYING chart shows the price history of Mid-Continent crude and regular grade gasoline. It shows that the price trend of gasoline has not kept pace with the price trend of crude oil. The refiner is, therefore, faced with a condition whereby the cost of his raw material has increased faster than the selling price of his product. In addition, manufacturing expenses have increased, due to increased cracking and reforming, the use of lead, higher labor rates, and similar items. To carry out these operations, tremendous capital investments have been made in equipment with resulting high depreciation and interest charges. All of these items, therefore, mean a higher manufacturing cost.

As offsetting features, this newer equipment is much more efficient and has thereby effected some reductions in cost due to better fuel economy and higher recovery. The refiner who has not been able to install new equipment and modernize his old, finds himself in a difficult position and can only hope to subsidize his manufacture of motor fuel from revenues derived from other products or operations.

Ultimately adjustments of this situation must take place; however, today the refiner is giving more than the values received for his gasoline.

●

Current Problems in Marketing Petroleum Products

By Leon A. Bosch*

To aid in the stabilizing of the oil industry's markets, to facilitate more economical retail operations and to ward off criticisms of the oil industry from outside, the supplying oil companies must recognize the problems of the independent dealer and help him to meet them.

This was the suggestion of Prof. Leon A. Bosch, of Northwestern University School of Commerce, in his address before the Marketing Session of the American Petroleum Institute convention at Chicago.

The experience of the industry with the Dealer Marketing Plan, he brought out, has shown that the supplier's responsibilities in the retailing of petroleum products are as vital as before the Dealer Marketing Plan came into existence.

The interest and attention of the supplying companies in more selective selling and in assisting the dealer in his management and merchandising problems, may work as a stabilizing influence and a brake on the enthusiasm of prospective entrants into the retail field, he stated.

Prof. Bosch also discussed the state price maintenance laws as applied to gasoline retailing, but expressed his doubts, because of characteristics peculiar to gasoline selling, whether such laws would work out in this field.

(Presented at 19th Annual Meeting, American Petroleum Institute, Chicago, Nov. 17.)

THERE are several conditions related to the marketing of petroleum products which arrest the attention of the consumer and the observer of general marketing practice. First of all, one cannot help wondering at the huge number of retail establishments where gasoline and oils may be purchased. Many of them are poorly equipped and unattractive in appearance, while others almost lose their commercial appearance in the ambitious beauty and size of their architecture.

At these stations, the motorist is respectively pleased and irritated about the kind of service he gets at these stations. Too many times he leaves the driveway feeling he does not care to return. So the management of the service station provides a second source of interest. Many consumers are increasingly attracted to the larger station where they feel that the equipment and personnel are frequently superior to those of the smaller station. Sometimes the consumer is slightly wary of the selling tactics of the station attendants, but upon investigation discovers the suggestions usually are completely reasonable and frequently quite desirable for the longtime interests of his car and its motoring requirements.

The pricing practices and frequent price wars are a third attention getting factor. Bank nights, discount books, free automobiles, chinaware, accident insurance, and the familiar "5 cents off" often prompt the question; "just what is the price and profit margin on gasoline anyway?" The consumer perhaps feels that he is the beneficiary when these discounts are offered.

"No adulteration or substitution" signs may cause some suspicion about the quality of the product, but savings in price are usually more important to the buyer than the possible risk of substituted quality, so he buys where he feels he can get the most for his gasoline dollar.

If these three circumstances attract the attention of the outsider, what is there that can be said about (1) the expanded retail structure, (2) the management problem of the service station, and (3) the species of price problems for gasoline, oils, and station services? Nothing thrillingly new nor penetratively different. The basic problems are as old as the modern gasoline market itself. To this group the chronic cancers of the marketing of petroleum products are an old story, but to you physicians in the industry there is value in reviewing the malignity of these tumors in the light of present day conditions. The issue, then, is not the newness of these problems, but the devastating fact that so little has been accomplished in combatting them, and that their importance today may be greater than ever before. The old problems thus constitute the current marketing problems of the industry.

First, what about the retail pricing problem of the industry at the present time? The big 1938 gasoline consuming period is now history. Glorious autumn weather has encouraged driving and this has supported consumption somewhat longer than normally. If gallonage alone were the criteria for success in the retail branch of the industry, the past season could be termed an adequate one, but apparently that gallonage was insufficient to go around, for in many sections persistent price-cutting has been resorted to.

Probably even greater gallonage might not have supported the early season prices. In any event, the experience of the past months seems clearly to indicate that gasoline volume is no guide to a stable retail price structure. To some observers it must seem that the Iowa or Dealer Marketing Plan has only meant that the dealers turned loose by the oil industry to make their own prices have received only the freedom to enter into profitless price competition.

Perhaps the dealer is still in the process of adjusting himself to being an independent business man; perhaps this process may continue for a considerable period of time until large numbers now engaged in the business are forced to withdraw. If this could mean permanent decrease in the number of retail outlets this purge might be condoned by all interested parties, except those compelled to "throw in the towel."

Unfortunately, however, we can be assured of no such result. Some refiners are too mad about gallonage, some jobbers are too eager for outlets, some property owners are too interested in income bearing "improvements," and there are always too many people uninformed or adventurous enough to try to make money selling gasoline where others have failed. No process of discouragement or bankruptcy is graphic enough to assure a permanently decreased number of retail outlets better adjusted to consumption requirements. Other controls must be exercised to gain that end.

One finds it possible to associate several causes with the chaotic price situation. In reviewing your trade publications and in discussing some of these problems with company representatives and retail dealers, one encounters the following suggestions:

1. First, the fear of anticipated slackened gallonage. Actually, of course, consumption figures for the first eight months of the year show a decrease of only 0.4 per cent.
2. The increased competition of unbranded and local brand gasolines of standard quality.
3. The overproduction of gasoline.
4. The existence of more retail outlets than can survive profitably.

*Northwestern University School of Commerce.

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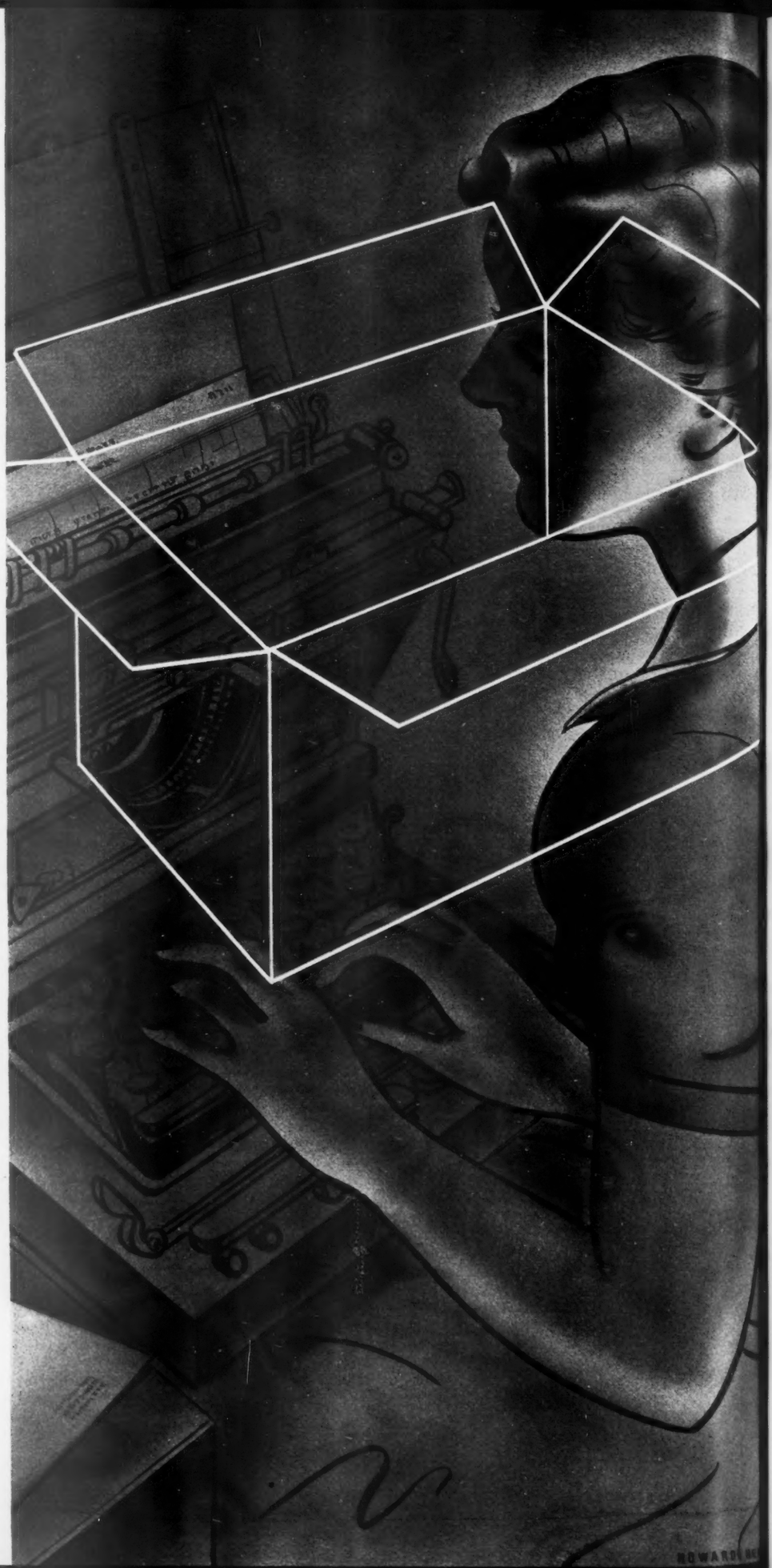

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5. Impractical pricing of greedy and uninformed dealers.

Observation will be made in this discussion to the last two factors only. Regarding the dealers' price practices in many areas, all of us are familiar with the natural urge on the part of dealers to secure wider margins after the wholesale leasing of the service stations. Today after the effects of this and other conditions have been noted, it is easy to criticize these attempts. At least the experience should teach every thinking trade member that high margins will not be sustained in the competitive market. Gasoline to most consumers is a staple item and a convenience good. In sale, gasoline enjoys a rapid rate of stockturn, is not completely seasonal nor subject to style change. Marketing experience generally evidences that such an article cannot be made to hold wide profit margins. Neither sound business practice nor the social responsibility imposed upon all business will allow them.

We cannot be confident, however, that all dealers are aware of this. Recently a group of gasoline merchants applauded a speaker who revealed that, until recently, when "price-cutters" entered the picture, the dealers in his community had been getting a six-cent margin per gallon of gasoline!

The marketing division of the refining industry cannot afford to shrug its shoulders and feel that retail pricing as a dealer's problem does not affect the supplier. It has been contended that a major reason inducing the leasing of all stations was the desire on the part of refiners to remove themselves of the immediate responsibility for establishing retail prices.

IN SHIFTING this responsibility for coping with the baffling forces of competitive price-making, there apparently developed in some quarters a marked indifference toward what the retailer did about his pricing situation. That mistakes have been made by retailers lacking the money, talent, and facilities employed by refiners for research and forecasting, can be no great surprise. What they did, individually and collectively, however, became the retail price structure for the refined products and its effects are as important now as ever in affecting the refiner's position and problems in the industry.

Three results of rampant price-cutting caused in part by both excess retail outlets and impractical pricing are of serious concern to the company marketing an advertised gasoline product. In the first place, depressed retail prices force a downward revision of refinery prices. This may mean heavy losses on inventories. It usually results in a generally unsettled period for market operation. The jitters through which the industry has just passed, or is now passing, is attributed in part to the demoralized retail market of the past months.

A second resultant of a distressed retail market as affecting the refiner of an advertised product is the fact that, whenever a wave of destructive pricing rolls over an industry, the pressure on the manufacturer is strong to remedy the situation by restraining resale prices. The petroleum industry is no exception. At the present time resale price maintenance contracts for the sale of gasoline are used in several states. In other states interest is running high for such legislation to apply to gasoline.

Drugs, books, liquors, cosmetics and other items are selling under price contracts. Convinced that these contracts provide a stable market and a protected margin of profit to these merchants, the gasoline dealer in increasing numbers feels that it is a good thing for him too. Certainly it cannot be denied that if other articles may be sold under the alleged protection of resale price laws, there seems to be no good reason why gasoline should not be allowed to be so sold, although it is not clear that all state price maintenance laws as now phrased permit it.

Most consumers when informed about the subject are rather opposed to resale price maintenance because of a fear that higher prices will be charged for the product. Whether this is the case will depend in part upon whether the consumer lives in an urban or more sparsely populated area, and, further, on the type of store customarily patronized. It is true, also, that the legal minimum prices do not always become the actual prices in all stores and localities. While the consumer fear of higher prices is there, it must not be forgotten that the long-time interests of the consumer are not always best served in an immediate low price.

A number of factors seem to justify not putting gasoline under price contracts. Price maintenance can be applied most effectively on those products for which there is a widespread consumer brand allegiance. Brands without consumer preference usually have many acceptable substitutes in the consumer mind. The gasoline market cannot be said to be represented by strong brand preferences. While the wide advertising of branded gasolines has developed a general confidence in the advertised brands as compared with the unbranded or locally branded products, this advertising so far has not built a widespread market insistence for the particular brand of the advertiser.

A LOGICAL suggestion then for gasoline is to have all advertised products put under price contracts. As a practical measure this might be a difficult matter for the refiners to adjust without raising suspicion in some quarters about horizontal price collusion. In any event, the price nominated for the branded gasolines could not be stipulated without due regard for the competition of the trackside and local brand operator in different areas. A probable conclusion may seem to be then that gasoline as a product of standard qualities is sold too much on a price basis as a type of product to be successfully supported by price contracts on the individual brand of the product.

Assuming for the moment that the nature of the product and its market were more favorable toward resale price maintenance. There would still remain the problem of enforcement. It has been estimated that nine million customers are served in gasoline service stations every day. Evasion would always be attractive to some operators and seemingly not too hard to do, if competitively so minded. Experience in New York and New Jersey has been reported to show already that one of the most serious handicaps in the fair trade experiment on gasoline is the secret discounting.

A fixed retail profit margin tends to retard any competitive tendency toward decreasing the number of retail outlets. This would serve to cover up the mistakes of the past, and in so doing would help to destroy individual initiative. There is not one cost of filling station operation but many. The marginal dealer, under price competition, is the one who just manages to survive with the existing market prices for the product—he is the highest cost producer. Higher cost operators would like to be protected from their lower-cost competitors. Such

Qualifications of a Dealer

The characteristics of the successful service station operator were defined as follows by Prof. Leon A. Bosch, of Northwestern University School of Commerce, in his address before the institute at Chicago on "Current Problems in the Marketing of Petroleum Products:

The dealer must know engine and ignition systems of automobiles.
He must know how to service lubrication jobs and sell accessories.
He must know how to keep books.
He must know how to arrange displays effectively.
He must know how to supervise men.
He must be an information bureau.
He must be a chambermaid.
He must be a marketing expert who can gauge and sell the neighborhood's requirements.
He must be a gentleman, "even though the only times she comes into the station, it's for air, water, or to powder her nose."

protection is afforded in resale price maintenance if the stipulated prices are equal to, or above, their costs. Consumers generally do not favor legislation protecting costly operators unless such legislation has other compensating benefits in the economy.

It might even be contended that fixed retail margins, if attractive, can have the effect of encouraging an increase in the number of retailers. Apparent stabilized profits attract new comers. This effect, if realized, would work to the disadvantage of existing dealers by diluting their already diminished gallonage.

Gasoline merchants sometimes cite evils of price-cutting to support price-fixing—such as adulteration of product—but it is questionable whether legislation of doubtful desirability when applied to gasoline should be used indirectly to abolish evils already protected by law. There is law, for example, against product adulteration to protect the honest dealer and the consumer. Enthusiastic support of this law in attacking product adulteration directly seems to be more desirable than getting at it indirectly through price maintenance. If price-cutting depends on dishonest tactics, it can be contended that it will disappear when the latter are eliminated.

IN SUPPORT of resale price maintenance, the New York and New Jersey experiences are reported to show an improved marketing situation for the service station. Despite evasion of the contracts, if the law can be applied to abolish the excesses in discounting and unprofitable pricing, but still be indifferently applied in some areas, the austerity of the law may be affronted but some desirable benefits may be accomplished. If such a result obtains, the law will not vary greatly from a lot of other laws. Not complete enforcement but the extent of enforcement and the benefit of that enforcement is the important consideration.

In conclusion, the tested experiences of California, New York, and New Jersey should be waited upon and studied with open mind. In advance of permanent results, suggested effects of resale price maintenance on gasoline may be a bit premature. That gasoline merchants are thinking of resale price maintenance and presenting an organized front for it in many quarters is evident. Whatever the decision of refiners in any area may be, the refiner should exercise the privilege of presenting the economics of the question as he sees it. Understanding in these matters may avoid considerable trade friction. Retail cooperation and group organization is rapidly growing and these bodies should be given the right to listen and to be heard on those matters which vitally affect their members as merchants of petroleum products.

At a time when the petroleum industry is threatened with suggestions of public regulation, it would seem that increased legislation for the industry should be approached cautiously and with full command of the facts. On the other hand, of course, if the various divisions in the industry do not make voluntary business initiative work as it ought to, society may feel compelled to exercise greater control over the business.

Up to now price wars and their effects on refinery prices and in developing a demand for resale price maintenance have been mentioned as consequences of high margins. A third effect of such margins is the shift in consumer trade to the unbranded gasolines of high octane value. The differential between the prices of these products and the widely advertised brand cannot be very wide without encouraging gallonage shifts.

No doubt enough has been repeated here to remind ourselves that the pricing of the retailer is of vital concern to the refiner. Where the stabilization of the market is threatened by impractical pricing, the refiner might try to further the education of the dealer in the economics of the business. Business men everywhere favor stabilized prices but not all of them are willing to assume the responsibilities in reaching that goal. One effort of the refiner might be to disseminate practical pricing information to dealers. Secondly, the refiner might help the dealer in being less dependent upon gasoline volume. That suggestion leads to the second current marketing problem in the industry, namely—the management problem of the individual station.

"Balanced selling," or the sale of accessories and varied services in addition to gasoline and oil, is becoming a necessity for more and more stations. Various factors are responsible for this condition. They include:

1. The decreased gallonage available to the individual stations.

2. The fact that approximately 45 per cent of the stations doing business in 1935 enjoyed an average income of less than $73 a month to cover investment, labor, and management costs.

3. Studies of station expenses reveal that gasoline alone cannot pay the way for adequate station service.

4. The reported high turnover of dealers due to business failure.

The dealer who must "do something" to survive, and who sees in "balanced selling" a way out, finds encouragement in the general trend toward "one stop" retail stores. Developments in the drug field, the super-markets in the food trade, and super-service stations in petroleum illustrate this tendency. It may be that the number of gasoline service stations will not increase as rapidly in the future because of greater concentration of sales in stations with complete lines of accessories and service equipment in addition to gasoline and oils. It would not be surprising to find an increasing number of stations selling some convenience goods lines other than gasoline and oils in areas not adequately served by the other customary convenience goods stores.

Despite present indifference to "split accounts" there seems to be some possibility that this practice may develop. The absence of brand insistence, however, may make such development less obvious for gasoline stations than other convenience goods stores. The latter, however, usually carry a variety of merchandise and it would seem that the service station, too, with the most complete lines of products, and services would be the most logical kind of outlet. It appeals to the motorist's buying habits and it is rather surprising to casual observers that the development of this type of station should have been so long delayed. The motorist comes to the station to replenish gas and oil supply, and it is completely understandable that he grow to look upon it as the source of supply for all motoring needs.

The service station is an outlet which the motorist must frequent at short intervals. He not only comes himself but he must bring his automobile with him, and to the alert operator that is an open invitation for a number of sales. Imagine what the average druggist would do if a customer would bring his bathroom medicine chest and toilet goods drawer into the store for the druggist to examine! How the druggist would glory in the absence of many articles he has for sale. Or imagine a clothier getting into a customer's clothes closet for a first hand examination of his wardrobe. What a good salesman could do about that frayed brown suit, out-of-style tuxedo, shapeless fedora, or probably absent sport outfit, carries a lesson for most service station operators.

LIKE the dentist, the station attendant finds things wide open with everything in sight. The dentist does not overlook a cavity, and when he finds an earlier silver filling which is beginning to discolor the tooth, he suggests the advantage of a replacement with gold. *Service* dentists protect health by explaining dental care as related to health, appearance, and long run economy and protection. Gasoline and accessory service stations should likewise protect the life, and appearance of a car and its mechanisms and promote the safety of the car's occupants by really servicing motor transportation.

This petroleum marketer even has an advantage the dentist does not have. Both of them get a chance to see their sales opportunities at close range, both of them get a chance to trade on the "fear complex" of the customer over results if service advice is not heeded; but the station attendant's advice does not result in physical pain to the customer and usually it is much less expensive.

Viewed then from the angles of (1) the motoring requirements of the car owner, (2) the necessity of greater income to assure profitable returns to the station, (3) the buying habits of customers for staple, convenience goods, and (4) the choice opportunity

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MID-CONTINENT
EAST CHICAGO, IND., WOOD RIVER, ILL.

presented by the motorist when he brings his car to the station, the service station with a merchandising program consistent with the peculiarities and possibilities of its trading area, presents a "natural" for balanced merchandising effort.

Obviously, the operator of such a station requires an alert, capable management employing the usual aids to better business operation. The refiner and accessory supplier has the problem of upgrading those dealers whose business they desire to promote. The problems of getting good management and effective salesmanship from salaried station managers and attendants prior to 1935 are still vivid in memory. Today's dealer has no fewer problems and is additionally saddled with the responsibility of financial management.

From the supplier's point of view the management of the station is as vital now as before, and only shortsighted policy will permit any let-up in developing and equipping the dealer to meet the opportunity for the latter's survival in the purge brought about by present and future marketing developments. An awareness of the dealer's position, and a sympathetic constructive program to help him meet it, is a first obligation of the marketing organization of the supplier.

Remember the dealer has to know (1) engine and ignition systems, (2) how to serve lubrications and sell accessories, (3) how to keep books, (4) how to arrange displays effectively, (5) how to supervise men, and he has to be (1) an information bureau, (2) a chambermaid, (3) a marketing expert who must gauge and sell neighborhood requirements, and through it all, (4) he must be a gentleman always even though the only time she comes into the station it's for air, water, or to powder her nose.

THE dealer needs assistance in drawing up a budgeted sales plan for his station, and in the buying, pricing, and selling problems involved in realizing the program. Your interests are affiliated in a dollar and cents way in the extent to which the dealer is successful in developing his business opportunity in today's market of narrowing margins.

Assistance in this regard does not mean merely deluging him with clever booklets describing products which are "hidden roads to profits." Petroleum dealers see announcements of merchandise offers more often than they see their wives. What retailers need to put it in the words of one of them, is not more accessory deals, but some "real aid in planning sales, supervising operations, and using better methods given by men who really understand driveway problems, and who are sympathetic and genuinely constructive in their contacts with dealers."

It appears to many closer to the front line trenches than I am, that balanced selling may be not merely desirable for increased profits, but definitely necessary to assure survival. To aid in stabilizing the market, to facilitate more economical retail operation, and to ward off criticisms of the business, refiners must recognize the problem of the independent dealer and help him meet them.

Again this suggestion regarding one marketing problem carries us to the third and last issue for discussion. This one relates to the overbuilt retail structure for the marketing of gasoline and oils. That it is overbuilt to the extent that there is more marketing machinery than is necessary to give effective service to customers and so much machinery that the individual units cannot operate at the most economical basis finds general agreement. This same circumstance applies to retailing generally. In 1933 64 per cent of all retail stores excluding service establishments accounted for only 13.8 per cent of total retail sales.

In a large measure this result cannot be avoided; it emerges from competition, and represents the price society pays for the benefits of competition. Again the rapid expansion of the petroleum industry parallels the experience of other industries which, during periods of rapid growth, overextended themselves. As such there is a definite limit to the control which the individual marketing manager can hope to exercise in the matter. But the growth in the number of filling stations alone, excluding garages, other stores, and factory pumps, from 121,513 to over 200,000 since 1929 does not seem reasonable even though it can be explained. To date there is no legislation against selective distribution, and even in the petroleum industry there is no government instigated investigation—as yet at least—because a refiner voluntarily reduces marketing costs by selling his product only to the more substantial accounts.

In other industries, many manufacturers have and are reviewing their marketing set-up in terms of doing a more selective selling job. More profits and sometimes even greater sales have frequently resulted in concentrating distribution in fewer outlets. The petroleum business is not too different, and a growing appreciation of the costliness of distributing in every conceivable outlet, and a greater experience with the effects of such "gallonage mad" tactics on prices and price-cutting may well act as a sobering influence in the race for retail outlets in the petroleum industry too.

Only a reference need be made to the unethical character of discriminatory subsidies, if and when granted, and their effect on the volumes and profits of competing merchants. If the charges sometimes made against the competitive practices of some refiners in certain areas in particular instances are substantiated by fact, you would know it better than anyone else. Likewise, the unsoundness of some policies when viewed in their general and lasting effects even to the practitioner is part and parcel of your experience.

The gallonage obsession appears to have gripped all parties in the industry to the extent that the economical operation of the marketing branch of the industry has been disregarded. The extension of retail outlets to the point where the newer outlets destroy the stability and permanent effectiveness of the established station, without compensating benefits is as undesirable from a business and social point of view as the impractical pricing of some retailers as discussed previously.

More economical selling operations for both refiner and jobber, and a consequent need for smaller margins for their respective marketing operations, may well be possible through more selective selling operations. Secondly, larger volume in the established outlets encourages less expensive retail station operations and the development of a healthy, robust retail structure. To the extent that stations may become larger and more varied in their merchandise and services, more capital and better management will be required for their successful existence. This in turn will work as a stabilizing influence and as a brake on the enthusiasm of prospective entrants into the retail field.

SUCH an eventuality can never be realized, however, if refiners generally do not co-operate by refusing to sell every one who would put a pump in front of his house, run an air hose from a basement window and declare himself to be in the gasoline business. That operator, and tens of thousands very little better equipped than he is, form a disturbing influence in the marketing of petroleum products. They are not stations "servicing" motorists; at best they are only tank, radiator, tire and crankcase "filling" places.

Past experience should suggest that the newer marketing conditions test the wisdom of such policies. The immoderate pleasure of the moment's apparent slight gain in specific brand gallonage means a disregard of the means by which future and more stable and permanent markets may be protected. Thus the problems of the petroleum industry today, as for years past, are very definitely related to the retail pricing of the products, the management and development of the individual station outlet and to the issue of controlling the market in terms of an adequate number of station outlets. Present market conditions change the implications of these old problems for the refiner. A student of marketing economics sees both responsibilities and attendant benefits in the long run to the refiners in recognizing and giving voluntary counsel and assistance in the problems of retail pricing, the management of the station which seemingly must develop along certain lines, and in approaching sanely the matter of an expanded retail structure.

N. P. N. says this is an advertisement but we say it's national petroleum news

A modern station and a streamlined product produce sales for Santi Oil Company

Oscar Santi Says . . .

"I've done better the past two years than during the six years previous"

BACK in 1936 the Santi Oil Company of Walensburg, Colorado, after six years of operation in the area had not obtained what Oscar Santi considered his share of the gasoline volume. Having tried in many ways to correct the situation, Oscar finally decided to change to another brand of gasoline.

There are 12 oil companies operating in the same community as Santi Oil, and for six years Santi Oil had the dubious honor of having the smallest volume. Since changing to Phillips 66, in the short space of two years, Santi has forged ahead until now it has the second largest volume in the county.

There is stiff competition in Walensburg, yet Mr. Santi, like many other successful jobbers in the Middle West, found that competition isn't so serious if you choose a line of goods that you can believe in and can then merchandise aggressively. Here is what he writes:

"One of our company owned outlets has doubled its gallonage with Phillips 66 products over the major brand gasoline we previously handled. Our new modernistic station has been open only a short time, but it outsells in gallonage any other station of any other leading company in this town of 6500 population—and it is gaining gallonage month after month."

So much for gallonage. And Mr. Santi adds that as a distributor of Lee Tires (sold at most Phillips 66 stations) he is also crowding first place in tire sales for the county.

In a company which has climbed in the gasoline marketing business as rapidly as Phillips Petroleum Company, success stories are numerous. In good times and bad, Phillips has continued to grow, because its jobbers and dealers find that Phillips 66 products, Phillips policies, and Phillips 66 advertising produce sales.

Why don't you grow with us? Oscar Santi and dozens of other Phillips jobbers will tell you the same story: a Phillips franchise helps. If you want to know about the possibilities in your territory, just write, wire or phone the nearest Phillips Company office listed below.

PHILLIPS PETROLEUM COMPANY
Bartlesville, Oklahoma

Chicago Minneapolis St. Louis
Peoria Kansas City Wichita
Indianapolis Des Moines Omaha
Tulsa Amarillo

Pontiac adopts the alligator hood for 1939. The radiator ornament serves as a lock and a handle for the hood

NEW lubrication and other servicing features of the 1939 Pontiacs, information on which is important to the oil company and its service stations, are described in detail in the accompanying article, which is one of the series appearing regularly in NATIONAL PETROLEUM NEWS on the lubrication of the new models.

An important forthcoming article in this series will discuss the new Fords and the new addition to the Ford line, the Mercury.

Lubrication features of the new Plymouths were described in an article in the Sept. 28th NPN; of the 1939 Buicks in the Oct. 19th issue; of the new Chevrolets in the Nov. 2nd issue.

Lubricating The 1939 Pontiac . . .

Hypoid Rear Axle Adopted; New Rear Springs Accommodate Varied Loads; Remote Shift Control Continued as Standard Equipment.

By John W. Thompson
N. P. N. Staff Writer

FROM the standpoint of lubrication, the outstanding change over last year on the 1939 Pontiacs is the adoption of hypoid rear axles on all models.

Pontiac for 1939 has three models. Two of these, the Quality Six and the De Luxe Six, use the same 85 horsepower engine. The other model, an eight-in-line, has a 100 horsepower engine. These horsepowers, as well as bores and strokes, are identical with those in last year's engines.

The remote control gear shift, located on the steering column, and offered optionally by Pontiac last year, is included as standard equipment on all 1939 Pontiacs. The new Pontiac hood is of the alligator type, lifted from the front by the radiator ornament, which serves as a locking handle.

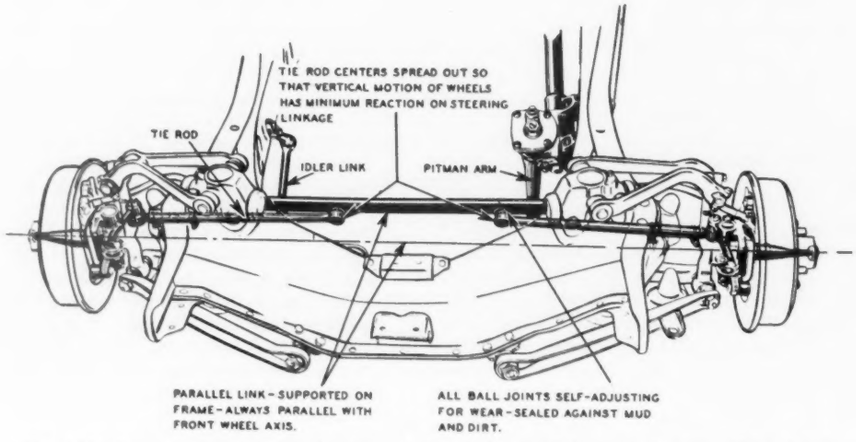
The most important mechanical changes are to be found in the chassis. Starting at the front, knee action has been refined by the use of lighter and stronger pressed steel arms, which make possible one inch greater rod clearance under the inner ends of the lower control arms.

A new parallel link arrangement of connecting steering tie rods is said to improve the handling of the car and to further reduce the tendency to shimmy. A horizontal link connects the steering gear pitman arm on the left side of the frame with an idler arm on the right side. Both arms swing in the same plane and the connecting link remains horizontal.

Pontiac in 1939 will make considerable mention of its novel rear spring design with which it claimed one passenger is given an easy ride as six. The design is simple. To the conventional leaf spring, and directly below it, there has been added a second but shorter auxiliary or helper spring. For light loads the car rides almost entirely on the main or upper unit which affords a slow comfortable motion. As the passenger load increases, this upper spring comes progressively more into contact with the helper spring. When this occurs, the rate of resistance to deflection builds up smoothly until full contact between the two units offers a maximum resistance to deflection.

On the six-cylinder Pontiac engine, the main crankshaft and connecting rod bearings have been increased ⅛ inch and a dual oil seal is now used to prevent oil leakage past the rear main bearing.

The most important improvement in the new and simplified single plate clutch is the new spring element. This is a shallow, cone-shaped, spring steel


TIE ROD CENTERS SPREAD OUT SO THAT VERTICAL MOTION OF WHEELS HAS MINIMUM REACTION ON STEERING LINKAGE
TIE ROD
IDLER LINK
PITMAN ARM
PARALLEL LINK - SUPPORTED ON FRAME - ALWAYS PARALLEL WITH FRONT WHEEL AXIS.
ALL BALL JOINTS SELF-ADJUSTING FOR WEAR - SEALED AGAINST MUD AND DIRT.

The 1939 Pontiac steering mechanism of the link parallelogram design. Here the conventional type of drag link is eliminated

disc or diaphragm with its center removed and slotted radially to form 18 integral clutch release fingers. This one spring disc replaces 21 parts.

On the Quality Six, the main shaft extends 5 inches to the rear of the transmission case, and on the De Luxe Six and Eight assemblies this shaft extends 18 inches beyond the rear face of the case. This long main shaft on the De Luxe models eliminates the separate propeller shaft extension, coupling and housing that were used in the 1937 and 1938 propeller shafts.

With hypoid rear axles on all 1939 models, Pontiac now recommends that the axle be drained and refilled twice yearly, or every 10,000 miles, with an SAE 90 hypoid gear lubricant. Thinning the lubricant for cold weather use is not recommended. Instead, an SAE 80 hypoid lubricant should be used for extremely cold weather. Ordinary or mild extreme pressure lubricants should not be used in the rear axle.

Attendants are cautioned against using hypoid lubricants in the transmission, although it is permissible to use extreme pressure lubricants. Pontiac for 1939 has dropped the SAE 160 gear lubricant from its transmission recommendation, now specifying only the SAE 140 for summer use above 60 degrees F. Below 60 degrees, an SAE 90 gear lubricant is recommended for the transmission as was the case last year. It is recommended the transmission be drained and refilled at the beginning of cool weather in the fall and at the beginning of warm weather in the spring. In the transmission, as in the rear axle, thinning of the lubricant for cold weather use is not recommended.

THE lubricant level in the steering gear should be checked twice yearly, or every 10,000 miles, and an all-season steering gear lubricant added if necessary.

In line with the growing feeling in the automotive industry that front wheel bearing failure is caused as much by improper bearing adjustment as by faulty lubrication, Pontiac for 1939 recommends that its front wheel bearings be lubricated only when it is necessary to remove the wheels for other work such as brake relining. The bearings should then be thoroughly cleaned and coated with a No. 2½ cup grease or special wheel bearing lubricant.

All knee-action lubrication points remain in the same location as last year, and are to be lubricated every 1000 miles with a chassis lubricant.

There have been some changes in the location of lubrication fittings on the steering mechanism due to the revamped design. While the two points at the outer tie rod ends remain the same, the steering relay rod, new this year, has a point at each end where it joins the two outer tie rod sections. The point at the left end of the relay rod also lubricates the lower end of the pitman arm. There is no drag

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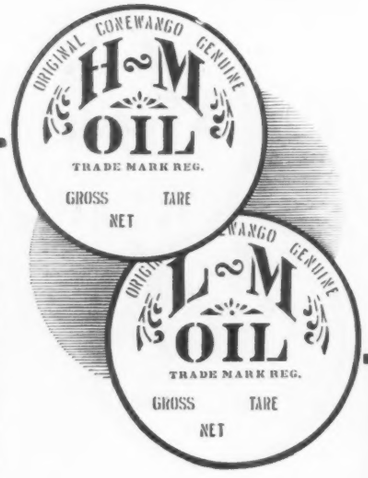

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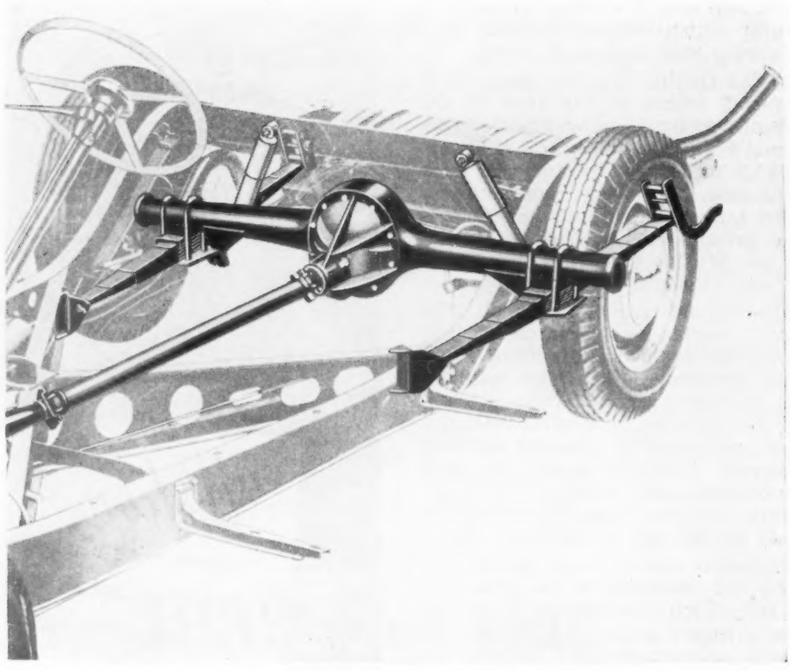

Rear of the 1939 Pontiac chassis, showing the hypoid rear axle, inclined shock absorbers, and Duflex rear springs

link in the new design, but there is a steering idler arm on the right side which has one lubrication fitting. All these points take a chassis lubricant every 1000 miles.

The front end of each rear spring is now fitted with a bushing which takes a chassis lubricant every 1000 miles. Following last year's design, the water pump is of the packless type and requires no further lubrication attention.

Universal joints are of the roller bearing design and are packed with lubricant at the factory. This supply of lubricant, according to the company, is sufficient for 30,000 miles or more. To lubricate the universal joints, it is necessary to disassemble them.

The remote control gear shift linkage is lubricated at assembly and requires further lubrication only when the parts are disassembled.

When the cars leave the factory the rear springs are lubricated and equipped with canvas-lined metal covers. It is recommended that the springs be lubricated at least every six months or 10,000 miles, whichever occurs first. A 40 per cent graphite grease is recommended, a No. 2½ cup grease to which has been added 40 to 50 per cent graphite by weight. The spring covers each have three 3/16th-inch holes on the underside through which lubricant can be forced.

Engine oil specifications remain the same as last year, as follows: Between 110 degrees F. and a low of 32 degrees, 20-W or SAE 20; between 110 and a low of 10 degrees, 20-W; between 70 and minus 10 degrees, 10-W; and between 20 and minus 30 degrees, 10-W plus 10% kerosine. Pontiac suggests that an SAE 30 oil may be used when it is expected that the average daytime temperature will be 90 degrees or higher.

FOLLOWING its 1938 policy, Pontiac again recommends crankcase drains every 2000 to 3000 miles under normal driving conditions. Cleaning of the crankcase ventilator inlet is recommended at least every 5000 miles, and it should be inspected during every 1000-mile chassis lubrication and cleaned then if necessary. To clean the unit, it should be removed from the car and washed in clean gasoline. Pontiac emphasizes the importance of cleaning the crankcase ventilator inlet periodically at the same time the carburetor air cleaner is cleaned.

Except for crankcase and cooling system capacities, the 1939 Six and Eight lubrication recommendations and capacities are identical.

With the exception of the fuel tank which now holds 16 gallons, two less than last year, the capacities remain unchanged. The crankcase of the Six takes 6 quarts and the Eight 7 quarts. The differential has a capacity of 3 pints, and the transmission 1¾ pints. The cooling system of the Six has a capacity of 16 quarts, while the Eight takes 19 quarts.

TRADEMARKS

The following are trademark applications pertinent to our field pending in the United States Patent Office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Munsey Building, Washington, D. C., trademark specialists.

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Pub. Oct. 11, 1938

FAX "Get The Facts", Ser. No. 408,-916. Fax Corporation, New York, N. Y. Filed July 26, 1938.

For Motor Fuels, Gasoline, Fuel Oils, Automotive Lubricating Oils, Automotive Lubricating Greases, Household Machine Oils, Kerosine, and Diesel Oil.

CATARACT, Ser. No. 409,289. Swan-Finch Oil Corporation, New York, N. Y. Filed Aug. 5, 1938.

For Lubricating Oils and Greases.

* * *

Published Oct. 18, 1938

BI-MIX. Ser. No. 409,546. John S. Zink, doing business as John Zink Company, Tulsa, Okla. Filed Aug. 12, 1938.

For gas burners and combination oil and gas burners.

* * *

Published Oct. 25, 1938

EMERY. Ser. No. 409,465. Emery Industries, Inc., Cincinnati, O. Filed Aug. 11, 1938.

For textile oils and textile oil bases, scouring oils and scouring oil bases, absorbefacients, fatty acids, and glycerine.

BONDED ANTI-FREEZE. Ser. No. 409,610. Gamble Stores Incorporated, Minneapolis, Minn. Filed Aug. 15, 1938.

For anti-freeze.

SAFCO. Ser. No. 400,476. Swan-Finch Oil Corporation, New York City. Filed Dec. 4, 1937.

For fuel oil, kerosine, gasoline, lubricating oils, lubricating greases, cutting lubricants, etc.

SEALED IN OIL, and design. Ser. No. 404,494. Sears, Roebuck and Co., Chicago. Filed Mar. 25, 1938.

For lubricating oil.

ROYAL, and design. Ser. No. 410,-005. Royal Petroleum Corp., New York City. Filed Aug. 26, 1938.

For fuel and heating oils.

MICROPAR. Ser. No. 410,441. Socony-Vacuum Oil Co., Inc., New York City. Filed Sept. 10, 1938.

For petroleum waxes.

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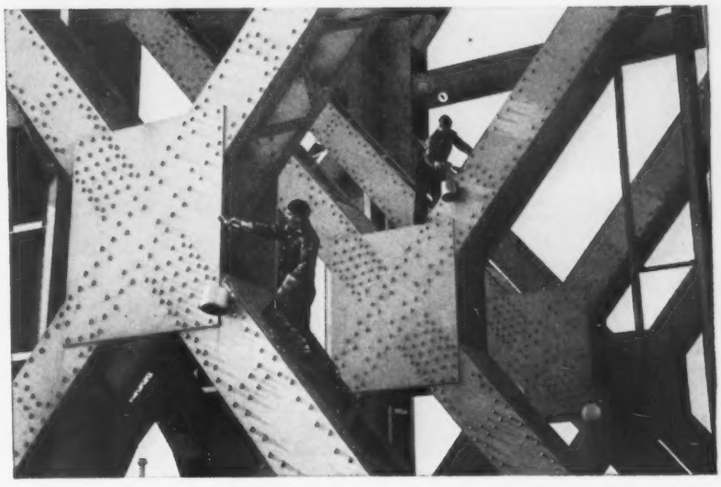

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Homewood Service Station located at Birmingham, Alabama, provides an easy entrance to its lubritorium. Its cleanliness and efficiently displayed equipment are easily seen from the pump island and draw in customers

Showing Off the Lubritorium

SOME of the answers to the question of what it takes to make a lubrication department click are supplied by A. D. Brown, manager of the Homewood Service Station, Birmingham, Ala. His lubrication department accounts for 50 per cent of his profits.

Brown lists the requisites of a good lubrication department as follows:

Proper layout and equipment, with a maximum of eye appeal.

Use of proper lubricants. (Brown uses seven kinds and that doesn't include oils.)

Mechanical knowledge of cars and interest enough in customers to see that they get what they pay for.

A follow-up system which will help customers remember when it is time to lubricate again.

The Brown lubrication department is located out in front of the station instead of in some bar or dark corner. It carries plenty of eye appeal, in fact it is one of the showplaces of an attractive station, which is as it should be at Brown's station. It is a department seen most by customers except for the gasoline pumps which are really a feeder for other services offered.

The lubrication department while out in plain view is completely closed in, easily handled overhead doors being a feature.

Equipment is just about all a small station could wish for and includes a drive-on lift, high pressure power lubricating unit, a unit for lubrication of chassis, low pressure auxiliary guns, gear lubricant pump, a gear flusher, a 250 gallon underground drain for crankcase oil and an attractive display board for tools.

Also in the same department is equipment for tube repairs including an electric tube plate, a motor for buffing tubes, a tire spreader, a battery tester and recharger and a spark plug tester.

The lubrication department handles about 150 cars a month and part of its volume comes from a combination offer of $1.50 for lubrication and washing. Lubrication is $1.00 straight, so that quite a number of customers are willing to pay 50 cents more for a wash job.

"WE approach the customer on the idea that it is best to have the car cleaned before lubricating, so that many of them have the washing done also instead of putting it off," said Brown. "This has added materially to our volume in this department. Our equipment also includes a vacuum cleaner service unit and we offer a thorough inside cleaning job with each cleaning and waxing. This has helped our polishing business quite a bit. Except on polishing jobs we charge 25 cents for vacuum cleaning a car interior."

The follow-up system used by Brown is similar to that recommended by various oil companies, but he is a great believer in it and follows it up religiously. A post card entitled "Let's Look at the Record," is mailed customers after each one has had time to drive about 1000 miles. This reminds them it is time to lubricate again, also lets them know they have not been forgotten by the station they last patronized.

Brown's lubrication department is

Many accessories are sold while the customer is waiting for his automobile to be greased. This attractive display of tires and other merchandise is located in the waiting room

scrubbed not once or twice a week, but once a day. After each lubrication job unless another car is waiting, loose oil on the floor (if any) is picked up. Sawdust is found an effective medium for picking up the oil with a minimum of floor spotting. A garbage can (in colors) is kept nearby to hold any refuse until the end of the day.

About half of Brown's customers are women and he has been real successful in cultivating their business. There is an attractive lounge with magazines, smoking stand, ice water and other convenience near the lubrication department. A spotless restroom, equipped with a vanity dresser and mirror, just like the boudoir in a nice home.

If any newcomers move into the neighborhood, Brown suggests to the woman of the house that if she will tell her friends to stop at the station then he will direct them to the house. This is an appreciated service in a new section where streets go by names rather than numbers and curve about considerably. He also makes friends with the children, supplies free air for their bicycles and repairs punctures. Courtesy is quite an adjunct to his he seems adept at thinking up little business, as it is to any business, but things to do that are appreciated.

CHICAGO — Transamerican Petroleum Corp. announces that it has been exclusive sales agent for Basin Oil & Refining Co. of Centralia, Ill.

Claims Nation's Fuel Bill Can Be Cut Half-Billion

N. P. N. News Bureau

NEW YORK, Nov. 10.—An actual saving of $500,000,000 in America's fuel bill for space heating is possible today by the elimination of preventable wastes, according to L. R. Taylor, president of the National Warm Air Heating and Air Conditioning Assn., in a letter which he has just sent to presidents and managers of 21 national associations representing the fuel, heating, air conditioning and building industries.

In his letter, he shows the nation's annual fuel bill for space heating to be approximately $1,930,910,000, of which oil represents $288,446,000, and coal and coke total $1,418,000,000. Next in order comes gas, representing $26,504,000, and electricity $12,960,000. Wood, peat and minor fuels total $185,000,000 annually, according to Taylor.

"We think it can be proved," writes Taylor, "that in the nation as a whole we will, this winter, throw away half a billion dollars in easily avoidable fuel wastes, and perhaps another half billion in ways that, theoretically at least, could be prevented."

He points out that the trouble lies in the fact that "there has been no united effort to apply remedies," and that "our national disregard of fuel economy is made up of a vast number of small individual wastings."

Savings can be accomplished, Taylor believes, by eliminating the causes of waste, chief among which he lists the following: neglected and obsolete equipment; inadequate insulation; poor mechanical regulation; inefficient hand firing; and infiltration of cold air.

Accessory Suppliers Meet

CHICAGO, Nov. 14.—Field managers of the Extension Line Department of the Pure Oil Co. met Nov. 14, 15, and 16 at the Mayflower hotel in Akron. Suppliers with displays and their representatives were to discuss merchandising plans with the oil company's field managers.

Suppliers represented were the General Tire & Rubber Co., National Battery Co., R. M. Hollingshead Corp., Miller Rubber Co., A. Schrader's Son, Illinois Bolt & Iron Co., Belden Mfg. Co., Bishop & Babcock Mfg. Co., A. C. Spark Plug Co., Anderson Co., American Grease Stick Co., Casco Products Co., Dill Mfg. Co., Handy Governor Corp., General Electric Co., Industrial Solvents, Inc., Lights, Inc., National Aluminate Corp., Protection Products Co., and the Shaler Co.

The meeting, first of its type held with all department field managers, also had on the program a discussion of the company's extension line merchandising plans for next year.

Winter Fuels

Berry's are prepared to furnish your requirements on modern fuel oils, range oils and furnace oils made with specifications to meet your particular needs.

We can ship promptly on short notice from conveniently situated refineries and terminals at prices we know will be competitive.

Your facilities, plus ours, gives you a setup equal to any.

We expect an increased demand for fuel oils this winter, due to the large additional installation of burners and would suggest you communicate with us at your earliest convenience.

JAMES B. BERRY SONS' CO., INC. OIL CITY, PA.

Branch Offices: **New York City; Chicago, Ill.; Boston, Mass.; Philadelphia, Pa.; London, England; The Hague, Holland.**

Refineries: **Oil City, Pa.; Emlenton, Pa.; Farmer's Valley, Pa.; St. Mary's, W. Va.**
Ocean Terminals: **Baltimore, Md.; Tiverton, R. I.; Dorchester, Mass.; Carteret, N. J.; Edgewater, N. J.; Glastonbury, Conn.; Philadelphia, Pa.**

Markets

Mid-Continent

TULSA, Nov. 14. — More active demand for natural gasoline from inland and Gulf Coast refiners last week was the main factor in tightening of supplies and an 0.125-cent advance in quotations for Grade 26-70, f.o.b. Group 3, according to reports in the Mid-Continent. One manufacturer reported receiving orders for five part-cargoes of natural gasoline for shipment over the next 30 days. Demand for northern delivery was reported brisk and two manufacturers said they were short of Grade 26-70 for immediate shipment.

Few open spot sales of refined gasoline were reported last week, and suppliers said no general changes had been made in their quotations. Deliveries against contracts were said to be unusually heavy for the season.

Conflicting reports were heard regarding kerosine demand although in the main traders said supply and demand were about in balance. One seller who had been quoting Oklahoma 42-44 grade at 4.125 cents reported advancing his price to 4.25 cents. Other quotations reported for this product ranged upward to 4.625 cents.

Eastern

NEW YORK, Nov. 14. — Mild weather along the eastern seaboard has resulted in continued heavy gasoline consumption, according to reports from distributors. With the heavy consumption, a steady volume of gasoline has moved through terminals and refineries, and except for occasional shaded quotations, prices were well held, traders said.

Gasoline stocks at two of the larger terminals in New York harbor last week were said to have reached the lowest point this year. Reports from other suppliers also indicated that terminal storage was at low ebb.

Mid-Western

CHICAGO, Nov. 14. — Further curtailment of refinery operations in the Mid-Continent resulted in more limited offerings of gasoline in the open market, traders here reported last week. Instructions for shipments against contract, however, were in good number as ideal motoring weather prevailed generally throughout the territory. No changes in quotations were reported during the week.

Offerings of Michigan straight run gasoline continued plentiful. One refiner reported shipping a considerable quantity to northern Ohio. Movement of higher octane grades was about on par with current production, refiners said.

Jobber demand for kerosine continued relatively slow although offerings on the open market were reported less numerous by some Chicago brokers. On the other hand, Michigan refiners reported a steady call for kerosine and inventories were said to be in good position.

Pennsylvania

CLEVELAND, Nov. 14. — While demand for light products was said to have been fairly good in western Pennsylvania last week, lower prices were reported for several items in both the upper and lower districts. Lubricating oils were only moderately active while the call for wax was brisk, refiners said.

In the upper field, U. S. Motor gasoline and 45 w.w. kerosine were offered 0.125 cent lower at 5.125 cents and 5 cents, respectively, and 36-40 fuel oil, 0.25 cent lower at 4.125 cents, according to reports of sellers. Fuel oil also was down 0.125 cent at 3.875 cents and "Q" gasoline off 0.25 cent at 6.5 cents in the lower field, sellers said.

Refiners said lube shipments were entirely against contracts and even these shipments were none too heavy. Reports of lower prices on bright stock lacked confirmation, refiners without exception saying they were quoting 25 pour test at a minimum of 14 cents for shipment in the open spot market.

Gulf

NEW YORK, Nov. 14. — Quotations for export grades of gasoline were slightly lower the second week of November, with sales reported late in the week at the lower levels.

The sale of 25,000 barrels of 61-63, 390 end point gasoline with 60 octane, and 25,000 barrels of the same grade with 65 octane number at 4.375 cents and 4.70 cents, f.o.b. the Gulf, respectively, was reported for lifting the last half of December.

Sale of 15,000 barrels of above 53 diesel index gas oil at 3.625 cents, f.o.b. the Gulf, for late December lifting also was reported.

Low diesel index gas oil, and No. 2 fuel oil were offered 0.125 cent by many suppliers early in the week. Both oils were available at 3.375 cents, traders said.

After increased activity the first week of November, the market for Bunker C fuel oil in cargo lots was reported steadier at a minimum of 62 cents per barrel.

California

LOS ANGELES, Nov. 12. — Renewal of interest by Japan in quotations for bulk quantities of California crude and fuel oil was a feature of offshore markets past week.

Bids are scheduled to be opened within the next few days on approximately 600,000 barrels of Japanese Navy fuel oil for delivery early next year. The last business of this nature went at 66.5 cents a barrel, California ports.

It was also reported tenders would be asked later in the month on seven or eight cargoes of aviation-type crude oil, delivery to start after the first of the year to the same buyer.

Atlantic foreign inquiry was understood to be in the market for a cargo of aviation gasoline, minimum 70 octane number.

Domestic markets continued to reflect an easiness in fuel and the lighter burning oils. Prices which meant a refinery net-back of 2.625 cents a gallon were reported quoted by a large supplier of diesel oil in the San Joaquin Valley.

In the Los Angeles Basin, large buyers continued to buy spot lots of diesel oil at $1.10 a barrel, although some sales were reported at $1.05, or 2.5 cents a gallon. Kerosine-distillate at the smaller plants was available at $1.15.

N.P.N. Gasoline Index

	Dealer T.w. Cents per	Tank Car gal.
Nov. 14	9.89	5.57
Month ago	9.90	5.70
Year ago	10.32	6.29

Dealer index is an average of "undivided" dealer prices, ex-tax, in 50 cities.

Tank car index is a weighted average of 12 wholesale markets for regular-grade gasoline.

Fuel Oil

CHICAGO, Nov. 14. — Light fuels responded moderately to the cold snap in the middle west last week, according to most traders here. Jobber demand for storage replacements was relatively slow but all grades of oil were more closely held, reports indicated.

All grades of Michigan light fuels were firm with open market offerings more limited, refiners said.

Industrial fuel movement in the Chicago area continued to show gradual improvement, according to most traders. Michigan refiners also reported better demand for heavy fuels from industrial centers and stocks of all grades were in fair shape, they said.

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TULSA, Nov. 14. — Little change

(*Continued on page* 48)

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days) unless otherwise stated. Prices in cents per gallon, except heavy fuel oils in dollars per barrel of 42 gallons, wax and petrolatums in cents per pound in barrels, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Gasoline

Prices Effective	Nov. 14	Nov. 7
OKLAHOMA		
U. S. Motor: (Octane L-3)		
62 oct. & below	3.75 – 4.50	3.75 – 4.50
63-66 oct.	4.00 – 4.625	4.00 – 4.625
67-69 oct.	4.375– 4.875	4.375– 4.875
70-72 oct.	4.625– 5.375	4.625– 5.375
60-62, 400 e.p.	4.00	4.00
WESTERN PENNA.		
Bradford-Warren:		
Motor gasoline:		
U. S. Motor (58-62°)	5.125– 5.25	5.25
Min. 65 oct.	6.25 – 7.00	6.25 – 7.00
Min. 70 oct.	(e)7.00	(e)7.00
"Q" gasoline	(e&g)7.00	(e&g)7.00
Other districts:		
Motor gasoline:		
U. S. Motor (58-62°)	4.75 – 5.00	4.75 – 5.00
Min. 65 oct.	(f)	(f)
"Q" gasoline	(g) 6.50 – 7.00	(g) 6.50 – 6.75

Prices Effective	Nov. 14	Nov. 7
CENTRAL MICHIGAN (a)		
Str.-Run Gasoline	(c) 4.50 –5.00	(c) 4.50 –5.00
U. S. Motor: (Octane L-3)		
67-69 octane	(e)7.25	(e)7.25
70-72 octane	7.75 – 8.00	7.75 – 8.00
CALIFORNIA (3c tax to be added if used in state)		
U. S. Motor:		
54-58, for instate shipment	6.50 – 9.25	6.50 – 9.25
54-58, for outside state shipment	6.00 – 9.00	6.00 – 9.00
58-61, 375-400 e.p., 65 oct. & above	7.75 – 9.75	7.75 – 9.75
N. TEX. (b)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.00 – 4.50	4.00 – 4.50
63-66 oct.	4.25 – 5.00	4.25 – 5.00
67-69 oct.	4.50 – 5.00	4.50 – 5.00
70-72 oct.	4.875– 5.375	4.875– 5.375
60-62, 400 e.p.	4.00	4.00
KANSAS (For Kansas destinations only)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.00 – 4.25	4.00 – 4.25
70-72 oct.	4.875– 5.125	4.875– 5.125

Prices Effective	Nov. 14	Nov. 7
W. TEX. (b)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.00 – 4.50	4.00 – 4.50
63-66 oct.	4.375– 4.75	4.375– 4.75
67-69 oct.	4.625– 5.125	4.625– 5.125
70-72 oct.	4.875– 5.00	4.875– 5.00
E. TEX.		
60 62, 400 e.p.	4.00 – 4.50	4.00 – 4.50
N. LA (For shipment to La. & Ark.)		
U. S. Motor: (Octane L-3)		
62 oct. & below	4.375– 4.75	4.375– 4.75
63-66 oct.	(e)4.625	(e)4.625
67-69 oct.	(e)4.875	(e)4.875
70-72 oct.	5.50	5.50
ARKANSAS (F.o.b. Ark. plant of one refiner, for shipment to Ark. & La.)		
U. S. Motor: (Octane L-3)		
62 octane & below	4.25	4.25
67-69 oct.	5.125	5.125
OHIO (Quotations of S. O. Ohio. Delivered anywhere in Ohio).		
U. S. Motor	7.375	7.375
Above 65 oct.	7.625	7.625

(a) Prices f.o.b. Central Michigan refinery group basis, for shipment within Mich. Shipments may originate at plants outside Central group. (b) For shipment to Texas and New Mexico destinations; Group 3 prices quoted on northern shipments. (c) Excluding Detroit shipment. (d) Nominal. (e) One refiner quoting. (f) No price reported. (g) To resellers holding licenses. (h) Two refiners quoting.

MID-WESTERN TANK CAR MARKET

Prices in this Midwestern Tank Car Market table are gathered from refiners and tank car marketers or brokers from their offices located in Chicago and the surrounding territory. While the prices are quoted on a Group 3 (Oklahoma) freight rate basis, this is in accordance with the custom of the oil industry which uses Group 3 as a price basis for the ease of comparing prices even when the material originates in another refining district. Generally when prices are quoted in this Chicago market, the origin of the material is not known at the time the quotation is given, oftentimes even with the quoting refiners who have refineries in more than one refining district. All other gasoline prices are given by and for the particular refining district where the material is made and from which it is shipped.

Gasoline

Prices Effective	Nov. 14	Nov. 7
U. S. Motor: (Octane L-3)		
62 oct. and below	3.50 – 4.00	3.50 – 4.00
63-66 oct.	3.75 – 4.625	3.75 – 4.625
67-69 oct.	4.00 – 4.75	4.00 – 4.75
70-72 oct.	4.125– 4.875	4.125– 4.875

Kerosine

41-43 w.w.	3.75 – 4.25	3.75 – 4.25
42-44 w.w.	3.75 – 4.375	3.75 – 4.375

(a) Nominal.

Fuel and Gas Oils

Prices Effective	Nov. 14	Nov. 7
No. 1 p.w.	3.625– 3.875	3.625– 3.875
No. 1 straw	3.625– 3.75	3.625– 3.75
No. 2 straw	3.50 – 3.625	3.50 – 3.625
No. 3	3.25 – 3.375	3.25 – 3.375
No. 5	(a) $0.60–$0.70	(a) $0.60–$0.70

Prices Effective	Nov. 14	Nov. 7
No. 6	(a) $0.35–$0.45	(a) $0.35–$0.50
U. G. I. gas oil	(a) 2.875–3.00	(a) 2.875–3.00
Range oil	3.75 – 4.00	3.75 – 4.00

Naphtha and Solvent

Stoddard solvent	5.875	5.875
Cleaners' naphtha	6.375	6.375
V. M. & P. naphtha	6.375	6.375
Mineral spirits	5.375	5.375
Rubber solvent	6.375	6.375
Lacquer diluent	7.375	7.375

Daily range of gasoline prices as reported in PLATT'S OILGRAM (Week Ended Nov. 11, 1938)

U. S. Motor, (Octane Number determined according to L-3 Method in Okla., Texas and Mid-Western Districts):	Nov. 7	Nov. 8	Nov. 9	Nov. 10	Nov. 11
62 octane and below:					
Oklahoma	3.75 – 4.50	3.75 – 4.50	3.75 – 4.50	3.75 – 4.50	3.75 – 4.50
(b) North Texas	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50
West Texas	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50
Mid Western (Group 3 basis)	3.50 – 4.00	3.50 – 4.00	3.50 – 4.00	3.50 – 4.00	3.50 – 4.00
63-66 octane:					
Oklahoma	4.00 – 4.625	4.00 – 4.625	4.00 – 4.625	4.00 – 4.625	4.00 – 4.625
(b) North Texas	4.25 – 5.00	4.25 – 5.00	4.25 – 5.00	4.25 – 5.00	4.25 – 5.00
West Texas	4.375– 4.75	4.375– 4.75	4.375– 4.75	4.375– 4.75	4.375– 4.75
Mid-Western (Group 3 basis)	3.75 – 4.625	3.75 – 4.625	3.75 – 4.625	3.75 – 4.625	3.75 – 4.625
67-69 octane:					
Oklahoma	4.375– 4.875	4.375– 4.875	4.375– 4.875	4.375– 4.875	4.375– 4.875
(b) North Texas	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00
West Texas	4.625– 5.125	4.625– 5.125	4.625– 5.125	4.625– 5.125	4.625– 5.125
Mid-Western (Group 3 basis)	4.00 – 4.75	4.00 – 4.75	4.00 – 4.75	4.00 – 4.75	4.00 – 4.75
70-72 octane:					
Oklahoma	4.625– 5.375	4.625– 5.375	4.625– 5.375	4.625– 5.375	4.625– 5.375
(b) North Texas	4.875– 5.375	4.875– 5.375	4.875– 5.375	4.875– 5.375	4.875– 5.375
West Texas	4.875– 5.00	4.875– 5.00	4.875– 5.00	4.875– 5.00	4.875– 5.00
Mid-Western (Group 3 basis)	4.125– 4.875	4.125– 4.875	4.125– 4.875	4.125– 4.875	4.125– 4.875
Motor Gasoline, 60-64 octane:					
New York harbor	(a) 6.00– 6.75	(a) 6.00– 6.75	(a) 6.00– 6.75	(a) 6.00– 6.75	(a) 6.00– 6.75
Philadelphia district	(a) 6.00– 6.50	(a) 6.00– 6.50	(a) 6.00– 6.50	(a) 6.00– 6.50	(a) 6.00– 6.50
Baltimore district	(a) 6.00– 6.50	(a) 6.00– 6.50	(a) 6.00– 6.50	(a) 6.00– 6.50	(a) 6.00– 6.50
Motor Gasoline, 65 octane & above:					
New York harbor	(a) 6.00– 6.75	(a) 6.00– 6.75	(a) 6.00– 6.75	(a) 6.00– 6.75	(a) 6.00– 6.75
Philadelphia district	6.25 – 6.50	(a) 6.25– 6.50	(a) 6.25– 6.50	(a) 6.25– 6.50	(a) 6.25– 6.50
Baltimore district	6.25 – 6.50	(a) 6.25– 6.50	(a) 6.25– 6.50	(a) 6.25– 6.50	(a) 6.25– 6.50
U. S. Motor, 58-62°:					
Bradford-Warren (Western Penna.)	5.25	5.25	5.125– 5.25	5.125– 5.25	5.125– 5.25
Other districts (Western Penna.)	4.75 – 5.00	4.75	4.75	4.75	4.75
Motor Gasoline, Min. 65 octane:					
Bradford-Warren (Western Penna.)	6.25 7.00	6.25 – 7.00	6.25 – 7.00	6.25 – 7.00	6.25 – 7.00
Other districts (Western Penna.)	(e)	(e)	(e)	(e)	(e)
Motor Gasoline, Min. 70 octane:					
Bradford-Warren (Western Penna.)	(c)7.00	(c)7.00	(c)7.00	(c)7.00	(c)7.00
"Q" Gasoline:					
Bradford Warren (Western Penna.)	(c&d) 7.00	(c&d)7.00	(c&d)7.00	(c&d)7.00	(c&d)7.00
Other Districts (Western Penna.)	(d) 6.50– 6.75	(d) 6.50 – 6.75	(d) 6.50 –6.75	(d) 6.50 –6.75	(d) 6.50 –6.75

(a) Nominal. (b) For shipment to Texas and New Mexico destinations: Group 3 prices are quoted on northern shipment. (c) One refiner quoting. (d) To resellers holding licenses. (e) No price reported.

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). Prices in cents per gallon except heavy fuel oils in dollars per barrel of 42 gallons, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included, unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Natural Gasoline

(Prices to blenders on freight basis shown below. Shipments may originate in any Mid-Continent manufacturing district.)

Prices Effective	Nov. 14	Nov. 7
F.O.B. GROUP 3		
Grade 26-70	3.00	2.75 – 3.00
F.O.B. BRECKENRIDGE		
Grade 26-70	2.75	2.75
CALIFORNIA (F.o.b. plants in Los Angeles basin)		
75-85, 350-375 e.p. for blending	6.25 – 6.50	6.25 – 6.50

Kerosine

WESTERN PENNA.		
Bradford-Warren:		
45 w.w.	5.00 – 5.125	5.125
46 w.w.	(e) 5.25 –5.375	(e) 5.25 –5.375
Other districts:		
45 w.w.	4.75 – 5.00	4.75 – 4.875
46 w.w.	(e)4.875	(e)4.875
47 w.w.	5.00 – 5.25	5.00 – 5.25
CENTRAL MICHIGAN (a)		
47-49 w.w.	5.00 – 5.30	5.00 – 5.30
OKLAHOMA		
41-43 w.w.	3.875– 4.25	3.875– 4.25
42-44 w.w.	4.25 – 4.625 (k)	4.25 –4.625
KANSAS (For Kansas destinations only).		
41-43 w.w.	(e)4.25	(e)4.25
42-44 w.w.	4.50 – 4.563	4.50 – 4.563
N. TEX. (b)		
41-43 w.w.	4.25 – 4.50	4.25 – 4.50
N. LA. (For shipment to La. and Ark.)		
41-43 w.w.	4.00 – 4.50	4.00 – 4.50
ARK. (F.o.b. Ark. plant of one refiner, for shipment to Ark. and La.)		
41-43 w.w.	4.50	4.50
CALIFORNIA		
40-43 w.w.	5.00 – 7.00	5.00 – 7.00

Gas *and* Fuel Oils

WESTERN PENNA.		
Bradford-Warren:		
36-40	4.125– 4.375	4.375– 4.50
Other districts: (Excluding Pittsburgh District Prices).		
36-40	3.875– 4.00	3.875– 4.00
CENTRAL MICHIGAN (a)		
P.W. Distillate	4.75 – 4.875	4.75 – 4.875
No. 3 gas oil, Str.	4.25 – 4.625	4.25 – 4.625
U.G.I. gas oil	4.00 – 4.375	4.00 – 4.375
Fuel Oils (Vis. at 100):		
500-700 Vis.	2.125– 2.50	2.125– 2.50
300-500 Vis.	2.25 – 2.75	2.25 – 2.75
100-300 Vis.	2.375– 3.25	2.375– 3.25
OKLAHOMA		
No. 1 prime white	3.75 – 4.00	3.75 – 4.00
No. 1 straw	3.625– 3.875	3.625– 3.875
No. 2 straw	3.50 – 3.75	3.50 – 3.75
No. 2 dark	(e)3.375	(e)3.375
U.G.I. gas oil	3.00	(e)3.00
28-30 fuel oil	(e)3.25	(e)3.25
28-30 zero fuel	3.25 – 3.50	3.25 – 3.50
24-26 fuel	(e)$0.925	(e)$0.925
14-16 fuel	(e)$0.70	(e)$0.70
KANSAS (For Kans. destinations only).		
No. 1 p.w. fuel oil	4.00 – 4.125	4.00 – 4.125
10-14 fuel oil	$0.45 –$0.80	$0.45 –$0.80
N. TEX. (b)		
No. 1 Prime white	(e)4.00	(e)4.00
N. LA. (For shipment to La. and Ark.)		
20-24 fuel	(e) $1.00–$1.05	(e) $1.00–$1.05
16-20 fuel	(e) $0.80–$0.85	(e) $0.80–$0.85
10-14 fuel	(e) $0.70–$0.75	(e) $0.70–$0.75
ARK. (F.o.b. Ark. plant of one refiner, for shipment to Ark. and La.)		
No. 2 fuel	3.625	3.625
28-30 gas oil, zero	3.375	3.375
Tractor Fuel	(j)4.50	(j)4.50

Prices Effective	Nov. 14	Nov. 7
CALIFORNIA		
San Joaquin Valley:		
Heavy fuel	$0.55 –$0.75	$0.55 –$0.75
Light fuel	$0.65 –$0.85	$0.65 –$0.85
Diesel fuel (per gal.)	2.625– 4.00	3.00 – 4.00
Stove dist. (per gal.)	3.25 – 5.00	3.75 – 5.00
Los Angeles:		
Heavy fuel	$0.45 –$0.90	$0.45 –$0.90
Light fuel	$0.60 –$1.00	$0.60 –$1.00
Diesel fuel (per gal.)	2.50 – 4.00	2.50 – 4.00
Stove dist. (per gal.)	2.75 – 5.00	2.75 – 5.00
San Francisco:		
Heavy fuel	$0.95	$0.95
Light fuel	$1.05	$1.05
Diesel fuel (per gal.)	4.50	4.50
Stove dist. (per gal.)	5.50	5.50

Note: All above heavy fuels meet Pacific specification 400; light fuel, spec. 300; Diesel fuels, spec. 200; and stove distillate, spec. 100.

Neutral Oils

WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only.)

Viscous Neutrals No. 3 col. (Viscosity at 70° F.)		
200 Vis. (180 at 100°) 420-425 fl.		
0 p.t.	19.00	19.00
10 p.t.	18.00	18.00
15 p.t.	17.50	17.50
25 p.t.	16.00	16.00
150 Vis. (143 at 100) 400-405 fl.		
0 p.t.	17.00	17.00
10 p.t.	16.00	16.00
15 p.t.	15.00	15.00
25 p.t.	14.00	14.00

SOUTH TEXAS		
Vis. Color		
Pale Oils: (*Vis. at 100°F.*)		
100 No. 1½-2½	4.75 – 5.25	4.75 – 5.25
200 No. 2-3	6.25	6.25
300 No. 2-3	6.75	6.75
500 No. 2½-3½	7.75	7.75
750 No. 3-4	8.25	8.25
1200 No. 3-4	8.75	8.75
2000 No. 4	9.00 – 9.25	9.00 – 9.25
Red Oils:		
200 No. 5-6	6.25	6.25
300 No. 5-6	6.75	6.75
500 No. 5-6	7.75	7.75
750 No. 5-6	8.25	8.25
1200 No. 5-6	8.75	8.75
2000 No. 5-6	9.00 – 9.25	9.00 – 9.25

Note: Red oil prices cover oils with green cast; blue cast red oils are slightly lower in some cases.

MID-CONTINENT (Vis. at 100° F.; F.o.b. Tulsa basis).

Pale Oils: (0 to 10 P.P.)		
Vis. Color		
60-85—No. 2	5.50	5.50
86-110—No. 2	6.00	6.00
150—No. 3	9.00	9.00
180—No. 3	9.50 –10.00	9.50 –10.00
200—No. 3	10.00 –10.50	10.00 –10.50
250—No. 3	11.00 –11.50	11.00 –11.50
280—No. 3	12.50	12.50
300—No. 3	13.00	13.00
Red Oils:		
180—No. 5	(e)9.00	(e)9.00
200—No. 5	9.00 –10.00	9.00 –10.00
280—No. 5	11.50 –11.75	11.50 –11.75
300—No. 5	(e)12.00	(e)12.00

Note: The following oils, of 15 to 25 p.p., are generally quoted these amounts under 0-10 p.p.; viscous oils, 0.5c; non-viscous, 0.25c. Viscous oils (150-300 vis.), No. 4 color, generally are quoted 0.5c above No. 5 color oils.

CHICAGO (Vis. at 100° F.)		
Pale Oils 0 to 10 p.p.:		
Vis. Color		
60-85—No. 2	7.25	7.25
86-110—No. 2	7.75	7.75
150—No. 3	9.00	9.00
180—No. 3	10.00	10.00
200—No. 3	10.50	10.50
250—No. 3	11.50	11.50

Prices Effective	Nov. 14	Nov. 7
CHICAGO (Continued)		
Red Oils:		
180—No. 5	9.00	9.00
200—No. 5	9.50	9.50
250—No. 5	10.50	10.50
280—No. 5	11.50	11.50
300—No. 5	11.75	11.75

Note: Viscous oils, 15 to 30 p.p. are quoted 0.5c lower; 60-85 and 86-110 No. 2 non-viscous oils, 15 to 30 p.p., 0.25c lower. To obtain delivered prices in Chicago, add 0.25c per gal.

Cylinder Stocks

MID-CONTINENT (F.o.b. Tulsa basis)		
Bright Stocks:		
190-200 Vis. at 210 °D.	(e)19.00	(e)19.00
150-160 Vis. at 210°D:		
0 to 10 p.p.	14.25 –16.00	14.25 –16.00
10 to 25 p.p.	13.50 –15.50	13.50 –15.50
25 to 40 p.p.	13.50 –15.00	13.50 –15.00
150-160 vis. at 210° E.	12.50 –15.00	12.50 –15.00
120 Vis. at 210° D		
0 to 10 p.p.	14.50 –15.125	14.50 –15.125
25 to 40 p.p.	(e)14.25	(e)14.25
600 S.R Dark Green	5.00 – 7.50	5.00 – 7.50
600 S.R. Olive Green	6.50 – 7.50	6.50 – 7.50
631 S.R.	(e)12.50	(e)12.50
Black Oil	3.50 – 4.00	3.50 – 4.00

CHICAGO (Viscosity at 210°)		
Unfiltered Steam Refined:		
140	9.00	9.00
160	10.00	10.00
200	11.00	11.00
Bright stocks, 160 vis. at 210. No. 8 color:		
0 to 10 p.p.	15.75	15.75
15 to 25 p.p.	14.75	14.75
30 to 40 p.p.	14.25	14.25
E filtered Cyl. Stock	13.50	13.50

Note: To obtain prices delivered in Chicago, add 0.25c per gal.

WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only.)

600 S.R. filterable	8.00	8.00
650 S.R.	10.00	10.00
600 fl.	10.50	(h)10.50
630 fl.	13.00	13.00
Bright stock, 145-155 vis. at 210°, 540-550 flash, No. 8 color:		
10 p.t.	17.00	17.00
15 p.t.	16.00	16.00
25 p.t.	14.00	14.00

Petrolatums

WESTERN PENNA. (In bbls., carloads; in tank cars, 0.5c per lb. less. One refiner reports he equalizes freight with nearest refinery to destination)

Snow White	5.875– 6.125	5.875– 6.125
Lily White	4.875– 5.125	4.875– 5.125
Cream White	3.875– 4.125	3.875– 4.125
Light Amber	2.50	2.50
Amber	2.25	2.25
Red	(e)2.125	(e)2.125

Wax

WESTERN PENNA. (Refiners report no open spot market sales being made to jobbers and give following as their quotations only. In bbls., carloads, New York)		
122-124 A.m.p., w.c. scale	(h) 2.30 –2.35	(h) 2.35 –2.40
124-126 A.m.p., w.c. scale	2.30 – 2.35	2.30 – 2.35
OKLAHOMA (In bbls. or burlap bags, carloads)		
124-126 A.m.p., w.c. scale	2.35	2.35

CHICAGO (In bags, carload lots. Melting points are E.M.P. (A.S.T.M.) methods; add 3° F. to convert into A.m.p.)		
Fully refined:		
122-124	4.00	4.00
125-127	(i)4.10	(i)4.10
127-129	(i)4.45	(i)4.45
130-132	(i)4.75	(i)4.75
132-134	(i)5.00	(i)5.00
135-137	(i)5.75	(i)5.75

(a) Prices f.o.b. Central Michigan refinery group basis, for shipment within Mich. Shipments may originate at plants outside Central group. (b) For shipment to Texas and New Mexico destinations; Group 3 prices quoted on northern shipments. (c) Excluding Detroit shipment. (d) Nominal. (e) One refiner quoting. (f) No price reported. (g) To resellers holding licenses. (h) Two refiners quoting. (i) Same prices quoted in bags or slabs loose. (j) For shipment to Ark. points only. (k) Correction: This price correct for Nov. 7.

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MARATHON LUBRICANTS BUILD GOODWILL

Volume sales and increased profits go hand in hand with Marathon Petroleum Products. When you sell Marathon Lubricants you gain the confidence and goodwill of your customers and bring them back for repeat sales because Marathon Lubricants and Marathon Motor Oil are made from the world's finest crude oil by one of the world's largest producers.

Marathon maintains a complete line of lubricants to fulfill the every need of your customers and there is a Marathon lubricant especially adapted for every lubrication problem.

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LINCO

THE OHIO OIL COMPANY

GENERAL OFFICES - - - FINDLAY, OHIO

ROBINSON, ILLINOIS TULSA, OKLAHOMA FT. WORTH, TEXAS

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline **do not include taxes;** *they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include* 1c *federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect* **Nov. 14, 1938,** *as posted by principal marketing companies at their headquarters offices, but subject to later correction.*

S. O. New Jersey

Essolene
(Regular Grade)

	Consumer Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
*Atlantic City, N. J.	6 9	8 9	4	8
*Newark, N. J.	6 9	8 9	4	8
Annapolis, Md.	7 85	9 35	5	9 5
Baltimore, Md.	7 25	8 75	5	8 5
Cumberland, Md.	8 65	11 15	5	10
Washington, D. C.	7 5	9	3	9 5
Danville, Va	8 45	10 95	6	12 9
Norfolk, Va.	7 25	9 75	6	11 5
Petersburg, Va.	7 55	10 05	6	11 7
Richmond, Va.	7 55	10 05	6	11 7
Roanoke, Va.	8 75	11 25	6	11
Charleston, W. Va.	8 05	10 55	6	12 6
Parkersburg, W. Va.	7 35	9 35	6	11 2
Wheeling, W. Va.	8 35	10 25	6	12 2
Charlotte, N. C.	8 65	11 15	7	12 1
Hickory, N. C.	9 15	11 65	7	12 5
Mt. Airy, N. C.	8 95	11 45	7	12 3
Raleigh, N. C.	8 25	10 75	7	11 6
Salisbury, N. C.	8 75	11 25	7	12 2
Charleston, S. C.	7 25	9 75	7	10 6
Columbia, S. C.	8 25	10 75	7	11 6
Spartanburg, S. C.	8 95	11 45	7	12 4

Discount to undivided dealers, except in Atlantic City and Newark, N. J., which see in "Note" below: Dealer t.w. price less 0.5c per gal.

*Effective Sept. 26, 1938, S. O. New Jersey posted a minimum retail resale price of 11.4c thru New Jersey, except Trenton area and Cumberland county.

Note: While the above posted prices continue at Atlantic City and Newark, N. J., dealers will pay a net price of 8.4c per gal. for Essolene. Dealers having pumps marked only Esso, Essolene and "Standard" White gasoline will pay 7.9c per gal. for Essolene.

Price basis to commercial consumers: To contract accounts, purchasing at least one full compartment at a time by hose connection: Effective March 12, 1937, in New Jersey, and March 8 in Maryland, District of Columbia, and in Arlington and Fairfax Counties in Virginia, on yearly purchases: from 2,500 to 100,000 gals., consumer t.w. price at time and place of delivery; 100,000 gals. per year consumer tank car price, plus 0.5c per gal. Generally consumer t.w. price in foregoing states is equivalent of dealer t.w. price, less 0.5c per gal.

Effective May 15, 1937, on Essolene and Esso (by tank wagon) in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax Counties, which see above), commercial consumers taking deliveries of 50 gals. (West Va. 100 gals.) or more at one time will be billed at the posted consumer t.w. price. Deliveries less than 50 gals. (West Va. 100 gals.) will be billed at 4c per gal. over posted consumer t.w. price. Generally, posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Kerosine Discount: 1c off t.w. price for 25 gals., or more, under contract thru territory (Baltimore City contract not necessary) except no discount in state of New Jersey.

Socony-Vacuum Oil Co., Inc.

(S. O. New York Division)
Socony Mobilgas
(Regular Grade)

	Consumer Tank Car	"Split" Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Metropolitan N. Y. City: Boroughs of Manhattan, Bronx and Brooklyn (Kings and Queens)	7.25	8.9	*5	8
Borough of Richmond (Staten Is.)	7 25	8 9	*5	8
Albany, N. Y.	7 3	9 3	5	8
Binghamton, N. Y.	8 5	10	5	9
Buffalo, N. Y.	7 6	7.9	5	7.5
Jamestown, N. Y.	7 3	9 3	5	8 25
Plattsburg, N. Y.	7 8	9.8	5	9
Rochester, N. Y.	8 2	9	5	8 5
Syracuse, N. Y.	7 9	9	5	8.5
Danbury, Conn.	7 6	9.6	4	9
Hartford, Conn.	7 4	9	4	7
New Haven, Conn.	7 3	8 8	4	6
Bangor, Me.	7 75	8.5	5	9
Portland, Me.	7 25	9	5	8 75
Boston, Mass	7	8.5	4	7.5
Concord, N. H.	8.1	9.7	5	9
Lancaster, N. H.	9	11.2	5	10 25
Manchester, N. H.	7.8	9.5	5	8 5
Providence, R. I.	7	8.5	4	7.5
Burlington, Vt.	7.65	9.7	5	9.5
Rutland, Vt.	8	10	5	8

*Plus 2% city sales tax computed at time of each sale.

Discount to undivided dealers: 0.5c less than "split" dealer t.w.

Price basis to commercial consumers: Effective about Nov. 15, 1936 in New York and New England for tank wagon delivery: monthly purchases of 25,000 gals. or over, pay consumer tank car price at point of delivery, plus 0.5c gal.; monthly purchases of 5,000 to 25,000 gals., pay undivided dealer tank wagon price at point of delivery; monthly purchases of less than 5,000 gals., pay divided dealer tank wagon price at point of delivery. Private consumers pay undivided dealer tank wagon price at point of delivery, plus 2c gal.

Atlantic Refining

Atlantic White Flash Gasoline
(Regular Grade)

	Commercial Tank Car	Dealer T.W.	Gasoline Taxes	Kerosine T.W.
Philadelphia, Pa.	7	8	5	10
Pittsburgh	8	8.5	5	10.5
Allentown	7.5	9	5	10.5
Erie	8	9	5	10
Scranton	6.9	7.4	5	10.5
Altoona	8	10	5	10.5
Harrisburg	7.5	9	5	10.5
Williamsport	7.5	9	5	10.5
Dover, Del.	...	7.5	5	10.5
Wilmington	...	8	5	9.75
Boston, Mass.	...	8.5	4	8
Springfield, Mass.	...	9	4	8
Worcester, Mass.	...	9	4	8
Fall River, Mass.	...	8.5	4	8
Hartford, Conn.	...	9	4	7
New Haven, Conn.	...	8.8	4	7
Providence, R. I.	...	8 5	4	8
Atlantic City, N. J.	...	8 4	4	8
Camden, N. J.	...	7.7	4	8
Trenton, N. J.	...	7 7	4	8
Annapolis, Md.	...	9.35	5	9.5
Baltimore, Md.	...	8 75	5	8 5
Hagerstown, Md.	...	9 85	5	10
Richmond, Va.	...	10 05	6	11 7
Wilmington, N. C.	...	9.85	7	10 8
Brunswick, Ga.	...	9	7	*10.5
Jacksonville, Fla.	...	9	8	10

*Georgia has kerosine tax of 1c per gal., not included in above price.

Discount to undivided dealers: Dealer t.w. less 0.5c per gal. except in Georgia and Florida, dealer t.w. and undivided dealer price is same.

Price basis to commercial consumers: consumers under contract, in Penna. and Delaware, effective Mar. 11, 1937, on yearly gasoline purchases taking full compartment hose deliveries, using 100,000 gals. or more per year, tank car price plus 0.5c per gal.; consumers taking less than 100,000 gals., undivided dealer price. Consumers under contract and not under contract, taking less than full compartment delivery, and consumers not under contract taking full compartment delivery, get divided dealer price. Consumers taking less than 25 gals., t.w. delivery, get 4c above undivided dealer price.

Discount on kerosine: Effective Oct. 29, 1936, in Pennsylvania and Delaware, 2c per gal. off t.w. price on t.w. deliveries of 25 gals. or more at one time.

S. O. Ohio

Sohio X-70 Gasoline
(Regular Grade)

	Consumer T.W.	†Divided Dlr.	Gasoline Taxes	Kerosine T.W.
Ohio Statewide	11	10	5	*12
Counties where some prices are below statewide:				
Butler, Clark, Clinton, Columbiana, Defiance, Greene, Pickaway, Preble and Warren:	10 5	9.5	5	....
Fairfield, Franklin, Montgomery and Paulding:	10	9	5	....
Hamilton	11	9	5	....
Knox	10.5	9	5	....

Renown Gasoline
(Third Grade)

Ohio Statewide	10 5	9.5	5	....
Counties where some prices are off statewide:				
Clark, Columbiana, Defiance, Montgomery and Pickaway	10	9	5	....
Clermont, Darke, and Miami:	11	9.5	5	....
Fairfield, Franklin and Paulding:	9.5	8.5	5	....
Hamilton	11	9	5	....
Knox	10	8.5	5	....

S. O. Ohio Cont'd

Kerosine Prices

(Off Statewide Level)

Kerosine prices are off statewide level in the following counties:

Allen, Auglaize, Champaign, Columbiana, Darke, Geauga, Greene, Hardin, Logan, Mahoning, Mercer, Preble, Putnam, Shelby, Trumbull and Van Wert *11.5
Paulding *11
Ashtabula *10.5
Fayette, Madison, Pickaway, Portage and Summit *8.5

†This price also to authorized agents, exclusive of 0.5c rental. Discount to undivided dealers: 0.5c less than divided dealer t.w.

*Ohio has kerosine tax of 1c per gal., not included in above prices.

Commercial Tank Wagon Q.D.A. to contract accounts: Effective Oct. 20, 1937, thru Ohio (except in 33 counties), on monthly purchases, off posted consumer t.w. price: 0 to 999 gals., 0.5c; 1,000 to 19,999 gals., 1.5c; 20,000 gals. and over, 2.5c. The 30 counties where Q.D.A. differs from statewide are: Allen, Ashtabula, Auglaize, Butler, Champaign, Columbiana, Cuyahoga, Darke, Defiance, Erie, Fulton, Geauga, Hamilton, Hancock, Hardin, Henry, Highland, Logan, Lorain, Lucas, Mahoning, Mercer, Ottawa, Paulding, Putnam, Sandusky, Scioto, Shelby, Trumbull, Van Wert, Williams and Wood.

Sales tax: Ohio's 3% sales tax, effective Jan. 27, 1935, is added "where assessable, to regular posted prices," S. O. Ohio says.

On kerosine, prices to resellers and commercial consumers are posted generally at 3c per gal. below consumer t.w. price in any quantity, when such prices are on statewide level.

S. O. Kentucky

Crown Gasoline
(Regular Grade)

	Consumer T.W.	Net Dlr.	Gasoline Taxes	Kerosine T.W.
Covington, Ky.	12	9	6	9.5
Lexington, Ky.	13.5	10 5	6	10
Louisville, Ky.	11.5	8.5	6	9
Paducah, Ky.	12	9	6	9
Jackson, Miss.	12.5	9 5	7	*9
Vicksburg, Miss.	12.5	9.5	7	*8 5
Birmingham, Ala.	13	10	*8	9 5
Mobile, Ala.	12	9	*9	8 5
Montgomery, Ala.	12	10	*9	9.5
Atlanta, Ga.	13.5	10.5	7	*9
Augusta, Ga.	13	10	7	*9
Macon, Ga.	13	10	7	*10
Savannah, Ga.	12	9	7	*8
Jacksonville, Fla.	12	9	8	8
Miami, Fla.	12	9	8	8
Pensacola, Fla.	12	9	*9	8
Tampa, Fla.	12	9	8	8

Kyso Gasoline
(Third Grade)

Covington, Ky.	10.5	8	6	....
Lexington, Ky.	12	9 5	6	....
Louisville, Ky.	10	7.5	6	....
Paducah, Ky.	10.5	8	6	....
Jackson, Miss.	10.5	8	7	....
Vicksburg, Miss.	10.5	8	7	....
Birmingham, Ala.	11	8 5	*8	....
Mobile, Ala.	10	7 5	*9	....
Montgomery, Ala.	11	8 5	*9	....
Atlanta, Ga.	11	8 5	7	....
Augusta, Ga.	11	8 5	7	....
Macon, Ga.	11	8 5	7	....
Savannah, Ga.	10	7.5	7	....
Jacksonville, Fla.	10.5	8	8	....
Pensacola, Fla.	10	7.5	*9	....
Tampa, Fla.	10.5	8	8	....

Discounts to all tank wagon consumers: Effective Jan. 4, 1937, thru territory, on Crown gasoline, 3c per gal. below consumer t.w. price; on Kyso, 2.5c below, regardless of quantity purchased, per month

**Taxes:* In the tax column is included these city and county gasoline taxes at the following points: Mobile, 2c city; Birmingham, 1c city; Montgomery 1c city and 1c county; Pensacola, 1c city. Georgia and Montgomery, Ala. have kerosine taxes of 1c per gal., and Mississippi 0.5c, not included in above prices.

Above prices include these inspection fees on both gasoline and kerosine, per gallon, figured on basis of 50 gallons per barrel:
Alabama, 1/40c on gasoline, 1/2c on kerosine; Arkansas, 1/5c per gal. in a single barrel, 1/20c per gal. in bulk; Florida, 1/8c; Illinois, 3/100c; Indiana, 1/5c per gal. in lots up to 25 bbls.; 2/25c per gal. in lots of 25 bbls. or more; Kansas, 1/50c, (3/50c can be charged to meet inspection department expenses); Louisiana, 1/32c; Minnesota, 1/25c; Missouri, 3/100c; Nebraska, 3/100c; Nevada, gasoline, 1/20c; North Carolina, 1/4c; North Dakota, 1/20c; Oklahoma, 2/25c per gal. lots of more than 50 in bbls., 1/5c in lots less than 50 bbls.; South Carolina, 1 8c; South Dakota, 1/10c; Tennessee, 2/5c; and Wisconsin, 3/100c on gasoline, 1/25c on kerosine.
Kerosine inspection fee only: Iowa, 3/50c; Michigan, 1/5c per gal.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline do not include taxes; they do, however, include inspection fees as shown in general footnote. Gasoline taxes shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Nov. 14, 1938, as posted by principal marketing companies at their headquarters offices, but subject to later correction.

S. O. Indiana

Red Crown (*Regular Grade*)
Stanolind (*Third Grade*)

	Red Crown Cons. T.W.	Dealer Prices Red Crown	Stano-lind	Gaso-line Taxes	Kero-sine T.W.
Chicago, Ill.	11.1	8 1	6.4	4	10
Decatur, Ill.	11.1	8 6	8	4	10
Joliet, Ill.	11.1	8 6	8 4	4	10
Peoria, Ill.	11.1	9.1	8.5	4	10
Quincy, Ill.	10 9	8 9	8	4	9 8
Indianapolis, Ind.	11 8	10 3	8 9	5	*9 5
Evansville, Ind.	11 6	10 1	9 1	5	*10 5
South Bend, Ind.	12 1	10 6	9 2	5	*9
Detroit, Mich.	10 3	8 8	7.5	4	9
Grand Rapids, Mich.	10 8	9 5	8	4	9 7
Saginaw, Mich.	11 8	10 3	9 3	4	9 3
Green Bay, Wis.	11 9	10 4	9	5	10 3
Milwaukee, Wis.	11 3	9 8	9 3	5	10 2
La Crosse, Wis.	11 5	10	9 5	5	10 4
Minneapolis-St. Paul	11 5	9 5	9	5	10 4
Duluth, Minn.	11 9	10 4	9 9	5	10 8
Mankato, Minn.	11 5	10	9 5	5	10 4
Des Moines, Ia.	10 9	9 4	7 5	4	*9 8
Davenport, Ia.	11 1	9 6	9 1	4	*10
Mason City, Ia.	11 3	9 8	9 3	4	*10 2
St. Louis, Mo.	10 7	9 2	7 5	*4	8
Kansas City, Mo.	10 4	8 9	6 9	*4	7 5
St. Joseph, Mo.	10 4	8 9	8 4	*4	9 3
Fargo, N. D.	12 7	11 2	10 7	4	11 6
Minot, N. D.	14	12 5	12	4	12 9
Huron, S. D.	12	10 5	10	5	10 9
Wichita, Kans.	9 9	6 6	5.5	4	7.8

*Taxes: in the tax column is included these city and state gasoline taxes at following points: Kansas City, St. Joseph and St. Louis, 1c city tax. Kerosine taxes: Indiana has 4c, Iowa 3c per gal. state tax, not included in above prices.

Discount to commercial consumers: Effective Jan. 1, 1935, thru territory, except Michigan effective Feb. 1, on purchases per month, discount off t.w. prices: all gasolines, 25 to 1,000 gals., at t.w. price; 1,000 gals., or more, 1.5c off t.w. on Ethyl and Red Crown, and 1c on Stanolind (latter effective June 9, 1937). Minimum delivery is 25 gals.

S. O. Nebraska

Standard Red Crown Gasoline
(*Regular Grade*)

	T.W.	Dealer	Gaso-line Taxes	Kero-sine T.W.
Omaha, Neb.	11.5	10	6	10.3
McCook	11 5	9.5	6	10
Norfolk	11.9	8.9	6	10.7
North Platte	12.3	9 4	6	11
Scottabluff	13	7.9	6	11.8

Discounts to commercial consumers: for tank wagon deliveries covered only by Standard Commercial Consumer Contract, effective January 1, 1935.

S. O. Louisiana

Essolene
(*Regular Grade*)

	Consumer Tank Car	Dealer T.W.	Gaso-line Taxes	Kero-sine T.W.
Little Rock, Ark.	7 25	9 75	7 5	11
Alexandria, La.	6 75	9 25	8	*11 5
Baton Rouge, La.	6 75	9 25	8	* 9 5
New Orleans, La.	6 75	9 25	*10	* 9
Lake Charles, La.	6 75	9 25	8	*11.5
Shreveport, La.	5.5	8	8	*10
Lafayette, La.	7	9.5	8	*11.5
Bristol, Tenn.	10.25	11	8	14.5
Chattanooga, Tenn.	9.5	12	8	14
Knoxville, Tenn.	10	12.5	8	14 5
Memphis, Tenn.	8	10 5	8	12 5
Nashville, Tenn.	9	9.5	8	12

*Taxes: New Orleans gasoline tax includes 7c state, 1c federal, and 2c parish tax. Louisiana has kerosine tax of 1c per gal.; in addition New Orleans has 1c parish tax, none of which are included in above prices.

Price basis to dealers: Undivided dealers get dealer price, less 0.5c.

Price basis to commercial consumers: Effective May 15, 1937, thru territory; commercial consumers taking 50 gals. or more at one time will be billed at posted consumer t.w. price; those taking less than 50 gals. at one time will be billed at 4c per gal. over posted consumer t.w. price. Generally, the posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Humble Oil & Refining Co.

Humble Motor Fuel
(*Regular Grade*)

	*T.W.	S.S.	Gaso-line Taxes	Kero-sine T.W.
Dallas, Tex.	8	12	5	8
Ft. Worth, Tex.	9	13	5	8
Houston, Tex.	9.5	13.5	5	8
San Antonio, Tex.	9	13	5	8

U. S. Motor Gasoline
(*Third Grade*)

	*T.W.	S.S.	Gaso-line Taxes
Dallas, Tex.	6	8	5
Ft. Worth, Tex.	7	10	5
Houston, Tex.	7	11.5	5
San Antonio, Tex.	8	10.5	5

*Price is t.w. price to all classes of dealers and consumers.

Continental Oil

Conoco Bronze (*Regular Grade*)
Demand (*Third Grade*)

	Dealer Prices— Conoco Bronz-z-x	De-mand	Gaso-line Taxes	Kero-sine T.W.
Denver, Colo.	10.5	9.5	5	11.5
Grand Junc., Colo.	14	13	5	15
Pueblo, Colo.	11.5	10.5	5	10 5
Casper, Wyo.	12	11	5	11.5
Cheyenne, Wyo.	8	7	5	13
Billings, Mont.	12	10	6	13
Butte, Mont.	13.5	10.5	6	15 5
Great Falls, Mont.	13	11	6	15.5
Helena, Mont.	14	13	6	15.5
Salt Lake City, Utah.	11	10	5	16
Boise, Ida.	13	10.5	6	18
Twin Falls, Ida.	15	12.5	6	18
Albuquerque, N. M.	11	10	†6 5	12
Roswell, N. M.	11	8 5	†6.5	10.5
Santa Fe, N. M.	12	9 5	*7	12
Muskogee, Okla.	8.5	6	5	7
Oklahoma City, Okla.	7.5	5.5	5	7
Tulsa, Okla.	7	5	5	6
Ft. Smith, Ark.	9 25	6.75	5	7.5
Little Rock, Ark.	9.25	7.625	7.5	9
Texarkana, Ark.	9	7	5	8

†Includes city tax of 0.5c.
*Includes 1c city tax.

S. O. California

Standard Gasoline
(*Regular Grade*)

	T.W.	S.S.	Gaso-line Taxes	Kero-sine T.W.
San Francisco, Cal.	13.5	14.5	4	11.5
Los Angeles, Cal.	13	14	4	10
Fresno, Cal.	14.5	15.5	4	12.5
Phoenix, Ariz.	15.5	16.5	6	*12.5
Reno, Nev.	15.5	16.5	5	13.5
Portland, Ore.	14	15	6	13.5
Seattle, Wash.	14	15	6	13.5
Spokane, Wash.	17	18	6	16.5
Tacoma, Wash.	14	15	6	13.5

Flight Gasoline
(*Third Grade*)

San Francisco, Cal.	12	13	4	....
Los Angeles, Cal.	11.5	12.5	4	....
Fresno, Cal.	13	14	4	....
Reno, Nev.	14	15	5	....
Phoenix, Ariz.	14	15	6	....
Portland, Ore.	12.5	13.5	6	....
Seattle, Wash.	12.5	13.5	6	....
Spokane, Wash.	15.5	16.5	6	....
Tacoma, Wash.	12.5	13.5	6	....

*Arizona has kerosine tax of 5c per gal., not included in above prices.

Discount to dealers: on gasoline, off t.w. price on Standard Ethyl and Standard Gasoline, to 100% dealers, 3c; to split dealers, 2c; on Flight gasoline, both 100% and split dealers, 2c.

On Stanavo Aviation Gasoline, to all classes of dealers, 3c off t.w.

To commercial consumers: off tank wagon price: on single deliveries of 40 gallons and over. Stanavo Aviation, Standard Ethyl and Standard Gasolines, 3c. Flight Gasoline, 2c per gallon. Tank wagon delivery, less than 40 gals., 1c per gal. above posted t.w. price. Discounts on kerosine: in tank cars, 3c off tank truck price; plant deliveries to jobbers, 2.5c below tank truck price.

Canada

PRICES OF IMPERIAL OIL LTD.
Per Imperial Gallon, which is 1.2 U. S. Gallons

3-Star Imperial Gasoline
(*Regular Grade*)

	T.W	Gasoline Taxes	Kero-sine T.W.
Hamilton, Ont.	15	6	15.5
Toronto, Ont.	15	6	15.5
Brandon, Man.	21.1	7	22 3
Winnipeg, Man.	20.5	7	20.7
Regina, Sask.	19	7	21
Saskatoon, Sask.	21 3	7	23 3
Edmonton, Alta.	19.5	7	21 5
Calgary, Alta.	16.5	7	18.5
Vancouver, B. C.	16	7	23
Montreal, Que.	14	6	14.5
St. John, N. B.	13.5	10	17.5
Halifax, N. S.	13.5	10	17.5

Discounts to undivided dealers, 1c off t.w. price, except Maritime Provinces where undivided dealers pay t.w. price. Divided dealers pay t.w. price, thru territory.

Aviation Gasoline

Following are tank car, tank wagon or dealer prices, as indicated, of aviation gasoline in several marketing territories.

S. O. OHIO
Thru Ohio
Esso Aviation

	Consumer T.W.	Gasoline Taxes
74 octane	15 5	5
80 octane	16 5	5
87 octane	17.5	5

Discounts: For delivery on contract to hangar operators and resellers: 2c below consumer posted t.w. price, shown above.

S. O. INDIANA
Stanavo Ethyl Aviation Gasoline
73 Octane Number

Chicago, Ill.	14 9 4
Detroit, Mich.	16 5 4
Milwaukee, Wis.	15 1 5
Minneapolis, Minn.	15 3 5
St. Louis, Mo.	14 5 3
Kansas City, Mo.	14 2 *4
Fargo, N. D.	16 5 4
Huron, S. D.	15.8 5

*Includes 1c city tax.

HUMBLE OIL & REFINING CO.
Aviation Gasoline

	Tank Car
Baytown, Tex.	8.5

CONTINENTAL OIL CO.
Conoco Special Gasoline

	Dealer	Gasoline Taxes
Denver, Colo.	14 5	5
Cheyenne, Wyo.	15	5
Helena, Mont.	17	6
Salt Lake City, Utah.	17.5	5
Albuquerque, N. M.	14	*6.5

*Includes city tax of 0.5c.

S. O. CALIFORNIA
Stanavo Aviation Gasoline

	T.W.	
Phoenix, Ariz.	17.5	6
Los Angeles, Cal.	15	4
San Francisco, Cal.	15.5	4
Reno, Nev.	17.5	5
Portland, Ore.	16	6
Seattle, Wash.	16	6
Spokane, Wash.	19	6

Note: For discounts, etc., see note under Standard and Flight gasoline above.

Naphtha (In Tank Wagon)

S. O. NEW JERSEY

	Posted Tank Wagon Prices Mineral Spirits	V.M.&P.
Newark, N. J.	11.5	15.5
Baltimore, Md.	15.5	....
Washington, D. C.	15	....

Discounts: Buyers taking following quantities, at one time, get these discounts: Newark, 2c per gal. on 200 gals. or more; less than 200 gals., 0.5c higher price. Baltimore 2c off on 25 to 100 gals. and 3c on over 100 gals. Washington, 2c off to contract buyers.

SOCONY-VACUUM OIL CO.

Buffalo, N. Y.	10 5	12
*New York City	9.5	10.5
Rochester, N. Y.	12	12
Syracuse, N. Y.	12	14.5
Boston, Mass.	11	11
Bridgeport, Conn.	11	11.5
Hartford, Conn.	10.5	11
Providence, R. I.	11	12

*Prices apply to consumers only in quantities over 1,000 gals. annually. For quantities under 1,000 gals. annually, add 0.5c per gal.

ATLANTIC REFINING CO.

Philadelphia, Pa.	11.5	12.5
Lancaster, Pa.	13	14
Pittsburgh, Pa.	12.5	14.5

Note: Prices for Mineral Spirits also apply to Stoddard Solvent; and prices for V.M.&P. Naphtha apply also to Light Cleaners Naphtha.

S. O. OHIO

	S.R. Solvent	V.M.&P. Naphtha
Thru Ohio	12.5	13.5

Note: V.M.&P. Naphtha prices also apply on Dry Cleaners naphtha and special Varnolene; Varnolene and Sohio Solvent 0.5c below these prices. Discounts to contract consumers, off t.w. price: 300 to 999 gals., 0.5c; 1,000 to 2,499 gals., 0.75c; 2,500 to 4,999 gals., 1c; 5,000 or more gals., 1.5c.

TANK WAGON MARKETS

Tank car, tank wagon, dealer, and service station prices for gasoline do not include taxes; they do, however, include inspection fees as shown in general footnote. Gasoline taxes, shown in separate column, include 1c federal, and state taxes; also city and county taxes as indicated in footnotes. Kerosine tank wagon prices also do not include taxes; kerosine taxes, where levied, are indicated in footnotes. Discounts to various classes of buyers also are shown in footnotes. These prices in effect Nov. 14, 1938, as posted by principal marketing companies at their headquarters offices, but subject to later correction.

S. O. INDIANA

(Prices include state and federal taxes)

	Oleum Spirits	V.M.&P. Naphtha	Stanisol
Chicago, Ill.	16.2	16.5	15.9
Detroit, Mich.	19.2	18.2	19.7
Kansas City, Mo.	13.9	14.9	14.4
St. Louis, Mo.	14.2	15.2	12.9
Milwaukee, Wis.	18.8	19.8	19.3
Minneapolis, Minn.	19	20	17.7

Note: All prices, with exception of Missouri points, include state tax. Prices shown are base prices, before discounts.

Naphtha (In Tank Cars)

In Tank Cars (F. o. b. refinery or seaboard terminal except Ohio, delivered price.)

	V.M.&P. Naphtha	Solvent
Baltimore	10.5	9.5
New York Harbor	10	9
Philadelphia district	10.5	9
Boston	10.5	9.5
Providence	10.5	9.5
Ohio points, delivered	8.875	*8

*This is on rubber solvent.

Note: In Ohio, prices on D.C. naphtha and special. Varnolene are same as V.M.&P.; on Varnolene and Sohio Solvent, prices are 0.5c less than on V.M.&P

Latest Changes

From Nov. 8 to Nov. 14 inclusive. Dates and amounts of changes shown. See table for full current prices.

S. O. Indiana—Red Crown:
Joliet dealer price cut 1c, Nov. 10.

Kerosine:
St. Louis cut 1.6c, Nov. 8.

Corrections

Notation of amount of change and dates not previously shown in table. Table in this issue is corrected to show these changes.

Atlantic Refining—White Flash Gasoline:
Wilmington, Del. dealer t. w. cut 0.5c, Nov. 2.
Trenton dealer t. w. cut 0.7c, Nov. 5.

S. O. Indiana—Red Crown:
Peoria dealer cut 0.5c, Nov. 5.

Stanolind:
Peoria dealer cut 0.6c, Nov. 5.
Green Bay dealer cut 0.9c, Nov. 4.

S. O. Louisiana—Essolene:
Nashville dealer t. w. cut 2c, Nov. 2.

Continental Oil—Conoco Bronz-z-z:
Muskogee and Oklahoma City dealer prices cut 1c, Aug. 31.
Billings dealer price cut 1c, Oct. 20.
Salt Lake City dealer price cut 1c, Nov. 3.

Demand Gasoline:
Muskogee and Oklahoma City cut 1c, Aug. 31.
Little Rock dealer cut 0.5c, Oct. 7, to 7.625c. Correct price, effective July 12, was 8.125c and this price should have been shown in tables since that date, rather than 7.625c, which was first shown in Oct. 5 issue, page 43.
Ft. Smith dealer price has been 6.75c since July 12, instead of 6.25c, to which it was changed in issue of Oct. 5, page 43.

Kerosine:
Little Rock up 1c, Aug. 22.

Fuel Oil

(Continued from page 42)

was reported in the fuel oil market situation in the Mid-Continent the second week of November. Demand for light oils was fairly active although shipments were largely against contracts, refiners said. Heavy fuels were quiet and reports indicated that refiners were continuing to add to their already burdensome inventories.

The Nos. 2 and 3 oils were closely held while the heavier fuels were offered freely. Only occasional open spot market sales were reported.

* * *

NEW YORK, Nov. 14. — Fuel oils continued to suffer from the mild weather in the east, and lower prices were reported in the New York harbor market.

Offerings of No. 2 fuel at 3.625 cents were reported early in the week. Indications were that the lower price was being made in an attempt to force movement which has lagged along with consumption. As the week progressed, however, reports were that the offerings at 3.625 cents had been withdrawn and sellers asked 3.75 cents and up for this grade.

Kerosine and No. 1 fuel oil also were offered at lower prices in the New York market.

Wax

NEW YORK, Nov. 14. — Export and domestic wax markets were featureless the second week of November. Prices for both the fully refined and the scale grades were unchanged, reports indicated.

While reports here were to the effect that scale grades were less freely available from Pennsylvania and the Mid-Continent, sellers continued to ask 2.35 cents and up for these grades, according to reports.

Finston Retires as Bell Manager

TULSA — Retirement of Albert Finston as vice president and general manager of the Bell Oil & Gas Co., Tulsa, has been announced by President Samuel L. Lubell. His resignation was effective Nov. 1.

President Lubell will assume active management of the corporation. Benedict L. Lubell has been named by the board of directors to the position of vice president and treasurer. Ben P. Piepgrass has been named secretary. I. A. Anson and M. Lloyd Freese continue as their vice presidents.

Finston had been associated with the corporation for 21 years, and since 1932 had been general manager, having succeeded the late Mark Finston.

Bulk Plant Moved

MILWAUKEE — The Milwaukee Badger Oil Co. is moving its bulk plant here from 43rd and Lincoln Ave. to 35th and Hopkins Ave. While the plant is being moved the company is making improvements through installing another pump, segregating pipelines, and installing a valve manifold.

TANK WAGON MARKETS, HEATING OILS

Prices in Effect Nov. 14, 1938

Following are posted tank wagon prices of various grades of heating oil at the points shown in various territories. Prices are in cents per gallon.

	No. 1	No. 2	No. 4
S. O. NEW JERSEY			
Atlantic City, N. J.	8.0	6.0	6.0
Newark	8.0	6.0	6.0
Annapolis, Md.	....	6.25	....
Baltimore	7.5	6.5	6.0
Washington, D. C.	7.25	6.5	6.5
Norfolk, Va.	7.0	6.0	6.0
Petersburg	7.25	6.25	....
Richmond	7.25	6.25	6.25
Charlotte, N. C.	8.75	7.75	....
Hickory	....	8.25	....
Raleigh	8.75	7.25	....
Charleston, S. C.	8.5	7.0	....
Columbia	9.5	8.0	....
Spartanburg	10.2	8.7	....

	No. 2	No. 3	No. 4
SOCONY-VACUUM OIL CO. INC. (S. O. New York Division)			
New York City	6.50	6.50	6.50
Albany, N. Y.	6.50	6.50	6.00
Rochester, N. Y.	7.50	7.50	7.50
Boston, Mass.	6.00	6.00	6.00
Bangor, Me.	7.0	7.0	7.0
Manchester, N. H.	6.50	6.50	6.50
Burlington, Vt.	8.00	8.00	8.00
Hartford, Conn.	6.00	6.00	6.00
New Haven, Conn.	5.25	5.25	5.25
Providence, R. I.	6.00	6.00	6.00

Note: Prices for No. 1 fuel in Socony-Vacuum territory same as for kerosine which see in tank wagon table for various cities; prices change with kerosine.

	No. 1	No. 2	No. 3	No. 4
ATLANTIC REFINING Cont'd				
Philadelphia, Pa.	7.75	6.00	6.00	6.00
Allentown, Pa.	8.50	6.50	6.50	6.50
Wilmington, Del.	7.75	6.00	6.00	6.00
Springfield, Mass.	8.00	6.50	....	6.50
Worcester, Mass.	8.00	6.00	....	6.00
Hartford, Conn.	7.00	6.00	....	6.00
S. O. OHIO				
Columbus Division and Cleveland	7.50	7.50	7.00	....
City of Lima	8.00	8.00	7.00	....
Rest of Ohio	8.00	8.00	7.50	....

Note: S. O. Ohio prices are for full compartment hose dumps, bucket dumps are 0.5c per gallon higher.

S. O. INDIANA
Stanolex Fuel and Furnace Oils

	No. 1 Fuel	Stanolex Furnace
Chicago	(a)6.5	6.5
Indianapolis	...	(b)7.8
Detroit	...	7.1
Milwaukee	8.4	7.7
Minneapolis	7.8	7.8
St. Louis	7.7	(c)6.7
Kansas City	6.8	6.8

(a) For 400 gals. and over; 150 to 399 gals., 7c; 1 to 149 gals., 8c.
(b) Excluding 4c state tax.
(c) For 400 gals. & over; 100 to 399 gals., 7c; 1 to 99 gals., 8c.
Note: Small-lot deliveries of light fuel oils range up to 2c higher than above quotations.

SEABOARD MARKETS, EXPORT AND COASTWISE

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). In cargo markets, spot shipment is 90 days. Prices in cents per gallon, except heavy fuel oil in dollars per barrel, in tank car lots, f.o.b. refineries or seaboard terminals in districts designated, unless otherwise noted. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Eastern Domestic

(Inter-refinery and export prices not included.)

MOTOR GASOLINE

Prices Effective	Nov. 14	
District:	(a)60-64 Oct.	(a) 65 Oct. & Above
N. Y. harbor	6.00 – 6.75	6.00 – 6.75
(b)N. Y. harbor	5.75 – 6.00	5.75 – 6.50
Philadelphia	6.00 – 6.50	6.25 – 6.50
Baltimore	6.00 – 6.50	6.25 – 6.50
Norfolk	6.50 – 7.00	6.75 – 7.25
Wilmington, N. C.	6.50 – 7.00	6.75 – 7.25
Charleston, S. C.	6.50 – 7.00	6.75 – 7.25
Savannah	6.50 – 7.00	6.50 – 7.25
Jacksonville	6.00 – 7.00	6.50 – 7.25
Portland	7.00 – 7.50	7.00 – 7.50
Boston	6.25 – 7.00	6.50 – 7.00
Providence	6.25 – 7.00	6.50 – 7.00

WATER WHITE KEROSINE

District:			
N. Y. harbor	4.625– 4.75	Charleston	5.00–5.25
(b)N. Y. harbor	4.50 – 4.625	Savannah	5 00–5.25
Philadelphia	4.75–5.00	Jacksonville	5.00–5.25
Baltimore	5.00–5.25	Portland	5 60
Norfolk	5.00–5.25	Boston	4.65–5.00
Wilmington, N.C.	5.00–5.25	Providence	4.75–5.00

(c)FUEL OILS

	N. Y. harb.	N. Y. harb. barges
No. 1	4.625– 4.75	4.50 – 4.625
Nos. 2-3	4.00 – 4.25	3.75 – 4.00
No. 4	3.875– 4.25	3.625– 4.00
No. 5	(a)$1.15	.....
No. 6	$0.85 –$0.95	.....

	Phila. dist.	Balt. dist.
No. 1	4.75 – 5.00	5.00 – 5.25
Nos. 2-3	4.25	4.25
No. 4	4.00	4.00 – 4.25
No. 5	$1.15	$1.15
No. 6	$0.85 –$0.95	$0.95

	Bost. dist.	Prov. dist.
No. 1	4.65 – 5.00	4.75 – 5.00
Nos. 2-3	4.00 – 4.25	4.00 – 4.25
No. 4	4.00 – 4.25	4.00 – 4.25
No. 5	$1.15	$1.15
No. 6	$0.95	$0.95

District:	(d)Bunker C Fuel	(d)Diesel Oil
N. Y. harbor	(f)$0.95	(g)$1.75
Philadelphia	(f)$0.95	(g)$1.75
Baltimore	(f)$0.95	(g)$1.75
Norfolk	(e)$0.95	$1.75
Charleston	$0.90	$1.75
Savannah	(e)$0.90	$1.785
Jacksonville	(e)$0.90	$1.785
Tampa	(e)$0.85	$1.785
Portland	$1.05	$1.85
Boston	(f)$0.95	(g)$1.75
Providence	$0.95	$1.75

	Gas Oil 28-34 Gravity	Diesel Oil Shore Plants
N. Y. harbor	4.00 – 4.25	4.00 – 4.25
Philadelphia dist.	4.25	....
Baltimore dist.	4.25	....
Norfolk dist	4.25	....
Savannah dist.	....	4.25
Jacksonville dist.	....	4.25

Pacific Export

(l) (Quotations are at seaboard, Los Angeles, in cargo lots, cents per gal., except where otherwise noted.)

Prices Effective	Nov. 14	Nov. 7
U. S. Motor, under 65 oct.	4.625– 4.75	4.625– 4.75
400 e.p. blend, under 65 oct.	4.75 – 4.875	4.75 – 4.875
400 e.p. blend 65 oct. & above	4.875– 5.00	4.875– 5.00
(h) 38-40 w.w. kerosine	4.25 – 4.75	4.25 – 4.75
41-43 w.w. kerosine	4.75 – 5.00	4.75 – 5.00
44 w.w. kerosine	5.25 – 5.50	5.25 – 5.50
In Cargo lots, per bbl.		
Diesel fuel, 24° & above	$1.05 –$1.20	$1.05 –$1.20
Diesel fuel, under 24°	$0.93 –$1.05	$0.93 –$1.05
(j) 30-34 diesel (gas oil)	$1.17 –$1.26	$1.17 –$1.26
(k) Grade C fuel oil	$0.60 –$0.70	$0.60 –$0.70

Prices Effective	Nov. 14	Nov. 7
In Ships' Bunkers, or deep tank lots, per bbl.:		
(j)Diesel fuel oil	$1.525–$1.55	$1.525–$1.55
(k)Grade C fuel oil	$0.70 –$0.90	$0.70 –$0.90
Cased Goods: (Per case)		
U. S. Motor	$1.40 –$1.525	$1.40 –$1.525
400 e.p. blend, under 65 octane	$1.50 –$1.60	$1.50 –$1.60
375–400 e.p. blend, 65 oct. & above	$1.60 –$1.70	$1.60 –$1.70
(h)40-43 w.w. kerosine	$1.30 –$1.40	$1.30 –$1.40
Kerosine, p.w.	$1.25 –$1.35	$1.25 –$1.35

New York Export

(Cents per gal. in bbls. F.a.s. New York)

CYLINDER OILS (Pennsylvania Products)

Bright stock:		
Light, 25 p.t.	21.50	21.50
Neutral oil:		
200 3 color, 25 p.t.	22.50	22.50
150 3 color, 25 p.t.	21.50	21.50
600 s.r., unfiltered	15.50 –16.50	15.50 –16.50
650 s.r., unfiltered	17.50 –18.50	17.50 –18.50
600 fl., s.r.	18.00 –19.00	18.00 –19.00
630 fl., s.r.	20.50 –21.50	20.50 –21.50

Wax, Domestic *and* Export

(A.S.T.M. Tests. Melting points, however, are A.M.P., 3° higher than E.M.P. Export prices, f.a.s., carloads. Domestic prices, f.o.b. refineries in New Orleans & New York districts in bags, carloads, with 0.2c discount allowed for shipment in bulk, except where noted below. Scale solid; fully refined, slabs in bags)

Prices Effective	Nov. 14	
	New York	
	Domestic	Export
124-6 Y.C. scale	2.35 – 2.50	2 35 – 2.50
122-4 W.C. scale	2.35 – 2.50	2.35 – 2.50
124-6 W.C. scale	2.35 – 2.50	2.35 – 2.50
123-5 Fully rfd.	3.75	3.375– 3.50
125-7 Fully rfd.	3.90	3.50 – 3 625
128-30 Fully rfd.	(l)4.00	3.65 – 3.875
130-2 Fully rfd.	(l)4.35	4.00 – 4.125
133-5 Fully rfd.	(l)4.65	4.40 – 4.625
135-7 Fully rfd.	(l)4.90	5.00 – 5.125
	New Orleans	
	Domestic	Export
124-6 Y.C. scale	2.25 – 2.50	2.25 – 2.50
122-4 W.C. scale	2.25 – 2.50	2.25 – 2.50
124-6 W.C. scale	2.25 – 2.50	2.25 – 2.50
123-5 Fully rfd.	3.75	3.375– 3.50
125-7 Fully rfd.	3.90	3.50 – 3.625
128-30 Fully rfd.	(l)4.00	3.65 – 3.875
130-2 Fully rfd.	(l)4.35	4.00 – 4.125
133-5 Fully rfd.	(l)4.65	4.40 – 4.625

Gulf Coast

(F.o.b. ship, Gulf oil terminals; minimum 20,000 bbls.; representing traders' opinions)

Prices Effective	Nov. 14	Nov. 7
For Domestic shipment:		
MOTOR GASOLINE		
59 oct. & below	4.375– 4.50	(a) 4.375–4.625
60-64 oct.	4.375– 4.625	4.50 – 4.75
65-67 octane	4.625– 4.875	4 75 – 5.00
68-70 octane	4.875– 5.125	5.00 – 5.25
FUEL OILS		
No. 1	3.625– 4.00	3.625– 4.00
No. 2	3.375– 3.50	3.375– 3.50
KEROSINE		
41-43 w.w.	3.875– 4.125	3.875– 4.125

For Export Shipment:	Nov. 14	Nov. 7
GASOLINE		
U. S. Motor Gasoline, no octane guarantee	(n)	4.25 – 4.75

Gasoline:	60-62, 400 e.p.	61-63, 390 e.p.	64-66, 375 e.p.
	Nov. 14		
60 octane	4.375–4.50	4.375–4.50	4.375–4.50
61 octane	4.375–4.50	4.375–4.50	4.375–4.50
62 octane	4.375–4.50	4.375–4.50	4.375–4.50
63 octane	4.375–4.50	4.375–4.50	4.375–4.50
64 octane	4.375–4.50	4.375–4.50	4.375–4.50
65 octane	4.625–4.75	4.625–4.75	4.625–4.75
66 octane	4.625–4.75	4.625–4.75	4.625–4.75
67 octane	4.625–4.875	4.625–4.875	4.625–4.875
68 octane	4.875–5.125	4.875–5.125	4.875–5.125
69 octane	(n)	(n)	(n)
70 octane	4.875–5.50	4.875–5.50	4.875–5.50
71 octane	(n)	(n)	(n)

Prices Effective	Nov. 14	Nov. 7
For Export Shipment:		
KEROSINE		
44 w.w.	(a) 4.125– 4.25	(a) 4.125– 4.25
41-43 w.w.	3.875– 4.125	3.875– 4.125
41-43 p.w.	3.875– 4.125	3.875– 4.125
GAS AND BUNKER OILS		
For Export Shipment		
Gas Oil (m):		
Below 43 diesel index	3.375– 3.50	3.375– 3.50
43-47 diesel index	3.375– 3.50	3.375– 3.50
48-52 diesel index	3.50 – 3.625	(a) 3.50 –3.625
53-57 diesel index	3.625– 3.75	(a) 3.625–3.75
For Domestic or Export Shipment		
Diesel Oil Ship's bkrs.	(o)$1.55	(o)$1.55
Grade C bunker oil for ship's bunkers	(o)$0 75	(o)$0.75
Grade C bunker oil, in cargoes	$0.62 –$0 65	$0.62 –$0.65

MID-CONTINENT LUBRICATING OILS

(Cents per gal. at Gulf; in bbls., f.a.s.; in bulk, f.o.b. terminals)

	Nov. 14	
	(p)Barrels	Bulk
190-200 vis. D. 210 brt. stock	22.50 –24.50	17.60 –17.75
150-160 vis. D 210 brt. stock:		
0-10 p.p.	19.00 –20.50	13.00 –14.75
10-25 p.p.	18.50 –20.00	12.50 –14.25
150-160 vis. E 210 brt. stock	18.50 –20.00	13.00 –14.50
120 vis. D 210 brt. stock	18.50 –20.00	13.00 –14.50

	Nov. 14	Nov. 7
180 vis. No. 3 color neutral:	Bulk	Bulk
0-10 p.p.	10.00 –10.50	10.00 –10.50
15-30 p.p.	9.50 –10.00	9.50 –10.00
200 vis. No. 3 color neutral:		
0-10 p.p.	10.00 –10.50	10.00 –10.50
15-30 p.p.	9.50 –10.00	9.50 –10.00
600 s.r. olive green	9.00 –11.25	9.00 –11.25
600 s.r. dark green	7.00 – 9.25	7.00 – 9.25

SOUTH TEXAS LUBRICATING OILS

(Vis. at 100° cold test 0, bulk export shipment, f.o.b. terminals.)

Unfiltered Pale Oils:		
Vis. Color		
100 No. 3	4.75 – 5.00	4.75 – 5.00
200 No. 3	6.25 – 6.75	6.25 – 6.75
300 No. 3	6.75 – 7.25	6.75 – 7.25
500 No. 3½	7.50 – 8.25	7.50 – 8.25
750 No. 4	8.25 – 8.75	8.25 – 8.75
1200 No. 4	8.75 – 9.25	8.75 – 9.25
2000 No. 4	9.00 – 9.50	9.00 – 9.50
Red Oils:		
Vis. Color		
100 No. 5-6	4.75 – 5.00	4.75 – 5.00
200 No. 5-6	6.25 – 6.75	6.25 – 6.75
300 No. 5-6	6.75 – 7.25	6.75 – 7.25
500 No. 5-6	7.50 – 8.25	7.50 – 8.25
750 No. 5-6	8.25 – 8.75	8.25 – 8.75
1200 No. 5-6	8.75 – 9.25	8.75 – 9.25
2000 No. 5-6	9.00 – 9.50	9.00 – 9.50

Note: Red oil prices cover oils with green cast; prices for blue cast red oils are slightly lower in some cases.

Tanker Rates

(Approximate freight rates to Continental ports, shillings per ton of 2240 lbs., British sterling; U. S. ports cents per bbl.)

Rates Effective Nov. 14

	Crude &/or Fuel		Refined Oil &/or Spirits	
	Last Paid	Owners Ask	Last Paid	Owners Ask
Gulf-U.K./Cont.(q)	12/	12/6-13/6	13/	14/-14/6
Aruba-U.K./Cont.(q)	10/3	10/6-11/3	11/	12/-13/
Gulf-N. Atlantic (r) (not E. of N.Y.):				
Hvy. Crude & fuel, (10 to 19.9 gravity)	22c	21-22c	....	....
Light Crude, (30 Grav. or Lighter)	20c	20-21c	....	....
Gasoline	....	....	21c	23-25c
Kerosine	....	....	22c	23-25c
Light Fuel	....	....	23c	23-25c

(a) Prices nominal. (b) In barge lots. (c) Fuel oils meet specifications of U. S. Commercial Standards CS12-35. (d) In ships' bunkers. (e) For barging, add 5c per bbl. (f) For barging, add 5c to 6c per bbl. (g) For barging, add 6.5c to 7.5c per bbl. (h) 150 fire point. (i) For San Francisco cargo prices, add 5c per bbl. to cargo prices shown above. (j) Pacific Specification 200. (k) Pacific Specification 400. (l) Shipment either in bags or in bulk. (m) Less than ½ of 1% sulfur. (n) No prices reported. (o) Barging 5c per bbl. additional at some Gulf ports. (p) Second-hand barrels. (q) Continental ports in range between Bordeaux and Hamburg, both inclusive. (r) Venezuela loading, same rate; Tampico, 2c to 3c per bbl. additional. (s) Low pour test, low viscosity, No. 5 generally quoted at $1.25.

CRUDE OIL MARKETS

Prices in $ per bbl. of 42 U. S. gals. at the well. A. P. I. gravity. Prices are effective as of 7 a. m. of dates as given

EASTERN FIELDS

Posted by Joseph Seep Purchasing Agency

(Effective Sept. 1, 1938, except Corning Oct. 18, 1938)

Penna. Grade Oil in Southwest Penna. Pipe Lines $1.34
Penna. Grade Oil in Eureka Pipe Lines (West Virginia) $1.28
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O.) $1.18
Corning Oil in Buckeye Pipe Lines (Ohio) ... $0.97

Posted by Other Companies

Tide Water Associated Oil Co.
Bradford-Allegany district (Penna. and N. Y.) (Effective Sept. 1, 1938) $1.68
*The Pennzoil Co.: (Effective Sept. 1, 1938)
Penna. Grade Oil in National Transit Lines *$1.61
*The Pennzoil Co. posts $1.61 in Cochran, Franklin, Hamilton and Doolittle, Pa. fields; prices in other lower districts range down to $1.56 per bbl. at well.

MICHIGAN

Posted by Pure Oil Co.

Midland, Midland County (Oct. 14, 1938) ... $0.925

Posted by Simrall Corp.

(Effective Oct. 13, 1938)

Allegan, Crystal, Greendale, Porter and equal grades $0.925
Beaverton, Buckeye, Bentley, Edenville ... $0.90
Freeman $0.87
West Branch, Arenac, and equal grades $0.74

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

(Effective Oct. 13, 1938)

Illinois and Princeton $1.05
Illinois Basin $1.15
Owensboro, (Western Ky.) $1.10
Lima, O. $0.90

Posted by Owensboro Corp.

Illinois Basin:
Beecher City (Effective Oct. 13, 1938) $1.15
Centralia Field:
Congested District (Effective Oct. 1, 1938) . $1.15
Area Outside Congested District (Effective Oct. 13, 1938) $1.15

Posted by Carter Oil Co.

(Effective Oct. 14, 1938)

Louden, Fayette County, Ill. $1.15

Posted by Ashland Oil & Transportation Co.

(Effective Oct. 14, 1938)

Somerset Oil in Ashland Lines, Kentucky:
Big Sandy River $1.12
Kentucky River $1.20

Posted by Stoll Oil Refining Co.

(Effective Nov. 10, 1938)

Stoll Pipe Line Oil (Ky.) $1.00

Posted by Fordsville Gathering Line, Inc.

(Effective Oct. 13, 1938)

Birk City Field, Ky. $1.10
Owensboro District, Ky. 1.10

CANADIAN FIELDS

Posted by Imperial Oil Limited

Western Ontario

(Effective Oct. 25, 1938)

Petrolia $1.90
Oil Springs $1.97

Alberta—Turner Valley

(Prices f.o.b. field tankage)

(Effective Jan. 5, 1938)

Crude Oil

40-40.9°	$1.14	53-53.9	$1.40
41-41.9	1.16	54-54.9	1.42
42-42.9	1.18	55-55.9	1.44
43-43.9	1.20	56-56.9	1.46
44-44.9	1.22	57-57.9	1.48
45-45.9	1.24	58-58.9	1.50
46-46.9	1.26	59-59.9	1.52
47-47.9	1.28	60-60.9	1.54
48-48.9	1.30	61-61.9	1.56
49-49.9	1.32	62-62.9	1.58
50-50.9	1.34	63-63.9	1.60
51-51.9	1.36	64-64.9	1.62
52-52.9	1.38		

Crude Naphtha, 65 grav. & above $2.14

Absorption Gasoline

90% Rec., 20 lb. Reid v.p. $1.94
90% Rec., 17 lb. Reid v.p. $2.08

MID-CONTINENT

Oklahoma-Kansas

*(Effective Oct. 11 to 22, 1938)

	S. O. Indiana	Carter Magnolia Sinclair Shell	Continental Texas Co.
Below 21°	$0.70	$0.60	....
21-21.9	.72	.63	....
22-22.9	.74	.66	....
23-23.9	.76	.69	....
24-24.9	.78	.72	....
25-25.9	.80	.75	....
26-26.9	.82	.78	....
27-27.9	.84	.81	....
28-28.9	.86	.84	$0.86
29-29.9	.88	.87	.88
30-30.9	.90	.90	.90
31-31.9	.92	.92	.92
32-32.9	.94	.94	.94
33-33.9	.96	.96	.96
34-34.9	.98	.98	.98
35-35.9	1.00	1.00	1.00
36-36.9	1.02	1.02	1.02
37-37.9	1.04	1.04	1.04
38-38.9	1.06	1.06	1.06
39-39.9	1.08	1.08	1.08
40 & above	1.10	1.10	1.10

*Effective by Carter Oil, Oct. 13, posting in Okla. only; Continental Oil, Oct. 11, with lowest grade below 29; Magnolia, Oct. 12, posting in Okla. only; Shell, Oct. 22; Sinclair-Prairie, Oct. 14, with lowest grade 21-21.9; S. O. Indiana, Oct. 17; The Texas Co., Oct. 12.

North-North Central and Central Texas

*Effective 1938:	Stanolind Oct. 17	Sinclair-Prairie Oct. 11	*Texas Co. *Continental	Magnolia Oct. 12
Below 21°.	$0.60	....	....	....
21-21.9	.62	....	....	....
22-22.9	.64	....	....	....
23-23.9	.66	....	....	....
24-24.9	.68	$0.76	$0.79	$0.79
25-25.9	.70	for	for	for
26-26.9	.72	oil	oil	oil
27-27.9	.74	below	below	below
28-28.9	.76	9°.	29°.	29°.
29-29.9	.78	.78	.81	.81
30-30.9	.80	.80	.83	.83
31-31.9	.82	.82	.85	.85
32-32.9	.84	.84	.87	.87
33-33.9	.86	.86	.89	.89
34-34.9	.88	.88	.91	.91
35-35.9	.90	.90	.93	.93
36-36.9	.92	.92	.95	.95
37-37.9	.94	.94	.97	.97
38-38.9	.96	.96	.99	.99
39-39.9	.98	.98	1.01	1.01
40-40.9	1.00	1.00	1.03	1.03
41-41.9	for	for	for	1.05
42-42.9	oil	oil	oil	1.07
43-43.9	40 &	40 &	40 &	1.09
44-44.9	above	above	above	1.11
45 & above	....	....	....	1.13

*Effective Oct. 11, by Continental, in North Tex.; Oct. 12, by Texas Co. in North & North Central Texas. Texas Co.'s lowest grade is 28-28.9, at $0.79.

Jefferson County, Texas

Beaumont (Magnolia)

(Effective Oct. 12, 1938)

Below 20°	$0.79	30-30.9	$1.08
20-20.9	0.82	31-31.9	1.10
21-21.9	0.85	32-32.9	1.12
22-22.9	0.88	33-33.9	1.14
23-23.9	0.91	34-34.9	1.16
24-24.9	0.94	35-35.9	1.18
25-25.9	0.97	36-36.9	1.20
26-26.9	1.00	37-37.9	1.22
27-27.9	1.02	38-38.9	1.24
28-28.9	1.04	39-39.9	1.26
29-29.9	1.06	40 & above	1.28

*For below 21°.

Oct. 11, '38, Stanolind Oil & Gas Co. posted same gravity and price schedule in West Beaumont field as Magnolia.

TEXAS FIELDS

Posted by Humble Oil & Refining Co.

(West Central Texas)

(Effective Oct. 11, 1938)

24-24.9	$0.71	35-35.9	$0.93
25-25.9	.73	36-36.9	.95
26-26.9	.75	37-37.9	.97
27-27.9	.77	38-38.9	.99
28-28.9	.79	39-39.9	1.01
29-29.9	.81	40-40.9	1.03
30-30.9	.83	41-41.9	1.05
31-31.9	.85	42-42.9	1.07
32-32.9	.87	43-43.9	1.09
33-33.9	.89	44-44.9	1.11
34-34.9	.91	45 & above	1.13

*Includes Brown, Callahan, Coleman, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, Throckmorton and Young counties.

Note: Effective Oct. 1, 1937, Humble prices are based on 100% tank tables at 60F.

East Central Texas

(Effective Oct. 11, 1938)

23-23.9	$0.78	32-32.9	$ .96
24-24.9	.80	33-33.9	.98
25-25.9	.82	34-34.9	1.00
26-26.9	.84	35-35.9	1.02
27-27.9	.86	36-36.9	1.04
28-28.9	.88	37-37.9	1.06
29-29.9	.90	38-38.9	1.08
30-30.9	.92	39-39.9	1.10
31-31.9	.94	40 and above	1.12

*Including Anderson, Cherokee, Limestone, Navarro counties.

PANHANDLE TEXAS

Posted by Humble Oil & Refining Co.

(Effective Oct. 11, 1938)

	Gray County	Carson-Hutchinson
28-28.9	*0.72	$0.67
29-29.9	0.74	0.69
30-30.9	0.76	0.71
31-31.9	0.78	0.73
32-32.9	0.80	0.75
33-33.9	0.82	0.77
34-34.9	0.84	0.79
35-35.9	0.86	0.81
36-36.9	0.88	0.83
37-37.9	0.90	0.85
38-38.9	0.92	0.87
39-39.9	0.94	0.89
40-40.9	0.96	0.91
41-41.9	0.98	0.93
42-42.9	1.00	0.95
43-43.9	1.02	0.97
44-44.9	1.04	0.99
45 & above	1.06	1.01

EAST TEXAS

(Effective *Oct. 11, 12, 13, 1938)

Gulf, Humble, Magnolia, Stanolind, Texas Co., Tide-Water Associated $1.10

*Effective Oct. 11 by Humble and Stanolind; Oct. 12 Magnolia, Texas, Tide Water; Oct. 13 by Gulf.

Shell also posted on Oct. 11, 1938, in Livingston area, Polk County, Texas, $1.10.

NORTHEAST TEXAS

(Posted by Humble, Oct. 11, 1938)

Talco $0.55

(Posted by Magnolia, Oct. 12, 1938)

Cass County and Panola County, Tex.:
Same gravity and price schedule as S. O. Louisiana posts for N. La.-Ark. Crude, which see under that company.

(Posted by The Texas Co., Oct. 12, 1938)

Cass County $1.05

WEST TEXAS AND NEW MEXICO

Posted by Humble Oil & Refining Co.

(Effective Oct. 11, 1938)

(Including Andrews, Crane, Crockett, Ector, *Gaines, Glasscock, Howard, *Reagan, Upton, Winkler and *Yoakum Counties, Texas and Lea county, New Mexico).

Below 20	$0.53	30-30.9	$0.75
20-20.9	.55	31-31.9	.77
21-21.9	.57	32-32.9	.79
22-22.9	.59	33-33.9	.81
23-23.9	.61	34-34.9	.83
24-24.9	.63	35-35.9	.85
25-25.9	.65	36-36.9	.87
26-26.9	.67	37-37.9	.89
27-27.9	.69	38-38.9	.91
28-28.9	.71	39-39.9	.93
29-29.9	.73	40 & above	.95

Pecos, West Texas $0.78

*Added to this posting, Aug. 29, 1938.

Oct. 12, '38, Magnolia met Humble in Crane, Glasscock, Howard, Mitchell, Upton and Winkler counties, except that its lowest grade is below 25 at $0.63.

Oct. 11, '38, Shell Petroleum met Humble in Crane, Ector, Glasscock, Howard, Upton and Winkler counties, Tex., and Lea county, N. M., except that its highest grade is 36 & above, at $0.87. It met Humble in Pecos, and in Pecos county Yates shallow pool, posted $0.65.

Oct. 11, '38, Stanolind Oil & Gas Co. met Humble in Hendrick field, Winkler, except that its lowest grade is below 26 at $0.65.

Oct. 12, '38, The Texas Co. posted in Ward and Winkler counties, Tex., and Lea county, N. M., same prices as Humble in West Texas, except that its lowest grade is below 26, at $0.65, and its highest grade, 36 and above, at $0.87.

Posted by Continental Oil Co.

(Effective Oct. 11, 1938)

Artesia, Jackson and Maljamar pools, New Mexico: gravity schedule beginning with below 29, at $0.61; 29-29.9, at $0.63; plus 2c differential for each gravity, up to 40 & above, at $0.85.

COLORADO

Posted by Continental Oil Co.

(Effective Oct. 11, 1938)

Ft. Collins and Wellington

Below 29	$0.81	35-35.9	$0.95
29-29.9	.83	36-36.9	.97
30-30.9	.85	37-37.9	.99
31-31.9	.87	38-38.9	1.01
32-32.9	.89	39-39.9	1.03
33-33.9	.91	40 & above	1.05
34-34.9	.93		

Canon City and Florence, Col. $0.90

SOUTH AND SOUTHWEST TEXAS

All Shown Below Posted by Humble Oil & Refining Co.

(Effective Oct. 11, 1938)

Carroll, Clark, Darst Creek, Hilbig, Salt Flat and Zoboroski crudes $0.96
Van crude $0.93
Flour Bluff $1.27
Pettus $1.29

Oct. 12, '38, Magnolia met Humble in Darst Creek; posted $0.87 in Luling; $0.99 in Lytton Springs; $1.14 for Cleveland, and $1.02 in Hardin, both in Liberty county, Tex.

Oct. 12, '38, The Texas Co. met Humble in Darst Creek.

Anahuac and Dickinson

(Effective Oct. 11, 1938)

Below 20°	$0.74	33-33.9	$1.09
20-20.9	.77	34-34.9	1.11
21-21.9	.80	35-35.9	1.13
22-22.9	.83	36-36.9	1.15
23-23.9	.86	37-37.9	1.17
24-24.9	.89	38-38.9	1.19
25-25.9	.92	39-39.9	1.21
26-26.9	.95	40-40.9	1.23
27-27.9	.97	41-41.9	1.25
28-28.9	.99	42-42.9	1.27
29-29.9	1.01	43-43.9	1.29
30-30.9	1.03	44-44.9	1.31
31-31.9	1.05	45 & above	1.33
32-32.9	1.07		

*Includes Barbers Hill, Cedar Point, Fairbanks, Gillock, Hull, Liberty, Orange, Pierce Junction and Raccoon Bend (shallow sand).

Raccoon Bend (Deep sand crude) Tomball and Satsuma

(Effective Oct. 11, 1938)

22-22.9	$0.95	34-34.9	$1.19
23-23.9	.97	35-35.9	1.21
24-24.9	.99	36-36.9	1.23
25-25.9	1.01	37-37.9	1.25
26-26.9	1.03	38-38.9	1.27
27-27.9	1.05	39-39.9	1.29
28-28.9	1.07	40-40.9	1.31
29-29.9	1.09	41-41.9	1.33
30-30.9	1.11	42-42.9	1.35
31-31.9	1.13	43-43.9	1.37
32-32.9	1.15	44-44.9	1.39
33-33.9	1.17	45 & above	1.41

(Continued on next page)

CRUDE OIL MARKETS

(Continued from preceding page)

South-Southwest Texas (cont'd)

(Effective Oct. 11, 1938)

Conroe.....$1.27

Jefferson County, Tex.

For Beaumont, see prices by Humble, Magnolia and Stanolind on previous page.

Posted by Humble
Mirando

(Effective Oct. 11, 1938)

Below 20°.....	$0.74	33-33.9.....	$1.09
20-20.9.....	.77	34-34.9.....	1.11
21-21.9.....	.80	35-35.9.....	1.13
22-22.9.....	.83	36-36.9.....	1.15
23-23.9.....	.86	37-37.9.....	1.17
24-24.9.....	.89	38-38.9.....	1.19
25-25.9.....	.92	39-39.9.....	1.21
26-26.9.....	.95	40-40.9.....	1.23
27-27.9.....	.97	41-41.9.....	1.25
28-28.9.....	.99	42-42.9.....	1.27
29-29.9.....	1.01	43-43.9.....	1.29
30-30.9.....	1.03	44-44.9.....	1.31
31-31.9.....	1.05	45 & above.....	1.33
32-32.9.....	1.07		

*Includes Duval, Jim Hogg, Jim Wells, Webb and Zapata counties, Tex. and Heyser and Placedo crudes.

Oct. 12, '38, Texas Co. posted for Duval-Mirando, $0.77 for below 21, plus 3c differential to 26-26.9, $0.95; 27-27.9, $0.97; 28 & above, $0.99.

Oct. 12, '38, Magnolia posted for Mirando, $0.81 for below 20, plus 2c differential to 40 & above, at $1.23.

LOUISIANA-ARKANSAS

Posted by Standard Oil Co. of Louisiana

(Effective Oct. 5 1938)

	*N. La.-Ark.	†Columbia County, Ark.	‡South Louisiana
Below 21°.	$0.73	$0.66	$0.74
21-21.9....	for	for	.77
22-22.9....	oil	oil	.80
23-23.9....	Below	Below	.83
24-24.9....	25°	25°	.86
25-25.9....	$0.75	$0.68	.89
26-26.9....	.77	.70	.92
27-27.9....	.79	.72	.94
28-28.9....	.81	.74	.96
29-29.9....	.83	.76	.98
30-30.9....	.85	.78	1.00
31-31.9....	.87	.80	1.02
32-32.9....	.89	.82	1.04
33-33.9....	.91	.84	1.06
34-34.9....	.93	.86	1.08
35-35.9....	.95	.88	1.10
36-36.9....	.97	.90	1.12
37-37.9....	.99	.92	1.14
38-38.9....	1.01	.94	1.16
39-39.9....	1.03	.96	1.18
40 & above.	1.05	.98	1.20

(Effective Oct. 5, 1938)

Smackover, Ark.....$0.73
Urania, La. (Ark. Fuel Oil Co., Jan. 28, '37)..$1.02

*Includes Bunkie, Caddo, Carterville, DeSoto, Homer, Haynesville, Rodessa, Sabine and Sarepta, in N. La.; El Dorado and Miller County, Ark. (latter is Ark. part of Rodessa field).

Note: S. O. Louisiana prices in all La.-Ark. fields, effective Oct. 5, 1938, are on 100% tank table basis.

†Includes Buckner, Magnolia, and Village pools.

‡Includes these fields: Baton Rouge, Bayou, Choctaw, Cheneyville, Darrow, Jeanerette, Lirette, N. Crowley and Roanoke.

Posted by Continental Oil Co.

(Effective Oct. 11, 1938)

*Tepetate and *Ville Platte, La.....$1.03

Oct. 12, 1938, Magnolia Petroleum and The Texas Co. posted same gravity and price schedule as S. O. La. posts in N. La.-Ark. in these fields: Magnolia, in Bull Bayou, Cotton Valley, Haynesville, Pine Island, and Rodessa, La., and Eldorado and Rainbow, Ark.; Texas Co. in N. La. Both also met S. O. La in Smackover. Texas Co. posted $1.24 for Garden Island, La. and $1.04 for Lafitte, La.

*GULF COASTAL FIELDS

Posted by Humble Oil & Refining Co.

(Effective Oct. 11, 1938)

Below 20.....	$0.79	30-30.9.....	$1.08
20-20.9.....	.82	31-31.9.....	1.10
21-21.9.....	.85	32-32.9.....	1.12
22-22.9.....	.88	33-33.9.....	1.14
23-23.9.....	.91	34-34.9.....	1.16
24-24.9.....	.94	35-35.9.....	1.18
25-25.9.....	.97	36-36.9.....	1.20
26-26.9.....	1.00	37-37.9.....	1.22
27-27.9.....	1.02	38-38.9.....	1.24
28-28.9.....	1.04	39-39.9.....	1.26
29-29.9.....	1.06	40 & above.....	1.28

†Refugio

Same prices as above Gulf Coastal crudes, plus these grades:

40-40.9.....	$1.28	43-43.9.....	$1.34
41-41.9.....	1.30	44-44.9.....	1.36
42-42.9.....	1.32	45 & above.....	1.38

†Includes also Saxet, Greta, O'Connor-McFadden, Taft, Plymouth and Tom O'Connor crudes.

*Humble's prices apply in these Texas fields: Amelia, Clear Lake, Goose Creek, Mykawa, Sugarland, Thompsons, Webster and West Columbia.

Oct. 11, 1938, Stanolind posted in Clinton, Hastings, High Island, So. Houston, and Spindletop, same prices as Humble in Texas Gulf Coast fields, except that Stanolind's lowest grade is below 21, at $0.82.

Oct. 12, 1938, The Texas Co. posted for Texas & La. Gulf Coast crude: $0.82 for below 21, plus 3c to 26-26.9, which is $1; from there on, 2c, to 34 & above, which is $1.16. In Refugio, same as other Gulf Coast, except highest gravity is 28 & above, $1.04.

ROCKY MOUNTAIN FIELDS

Posted by Stanolind Oil & Gas Co.

(Effective Oct. 11, 1938)

Salt Creek, (except Tensleep crude), Midway and Dutton Creek, Wyo., same schedule as Stanolind posts in Oklahoma-Kansas, ranging from $0.86 to $1.10, which see under Mid-Continent crude on previous page.

Tensleep, Salt Creek field.....	$0.646
Ills, light, Col.....	0.98
Ills, heavy.....	0.92
Elk Basin, light.....	0.90
Grass Creek, light.....	0.90
Frannie light.....	0.55
Grass Creek, heavy.....	0.40
Hamilton Dome, Wyo.....	0.35
Frannie heavy.....	0.42

Posted by Ohio Oil Co.

(Effective Oct. 11, 1938)

Elk Basin, Wyo.....	$0.90
Grass Creek, light.....	0.90
Rock Creek.....	1.00
Lance Creek.....	0.77
Dry Creek, Mont.....	0.92

(Effective May 1, 1938)

Grass Creek heavy.....$0.50

(Effective Nov. 16, 1937)

Sunburst, Mont.....$0.90

Posted by Continental Oil Co.

(Effective Oct. 11, 1938)

Cat Creek, Mont.....	$1.10
Big Muddy, Wyo.....	0.98
Lance Creek, Wyo.....	0.77

CALIFORNIA, *Posted by Standard Oil of California*

All gravities above those quoted take highest price offered in the field. Prices effective Feb. 26, 1936, except Huntington Beach, Playa del Rey, Santa Fe Springs, Kern Front, Signal Hill (Long Beach) effective March 7, 1936; Elk Hills effective June 22, 1936; Lakeview Area, Aug. 19, 1936; El Segundo and Wilmington, Oct. 15, 1937; Greeley-Canal, July 9, 1938; Santa Maria Valley, by Union Oil, Oct. 15, 1938.

Gravity	Signal Hill (Long Beach) El Segundo †Wilmington	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda Brea Canon	Athena Rosecrans	Domingues	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	‡Newhall and others	Mountain View	Elk Hills	Buena Vista Hills Midway-Sunset Lakeview Area	Greeley-Canal (Kern County)	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria (Union Oil)
13-13.9.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	$0.63
14-14.9.	$0.80	$0.79	$0.74	$0.78	$0.79	$0.80	$0.76	....	....	$0.80	$0.76	$0.76	$0.77	$0.78	....	$0.70	....	$0.70	$0.70	....	$0.70	$0.70	....	.65
15-15.9.	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.68
16-16.9.	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.70
17-17.9.	.80	.79	.74	.78	.81	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	.70
18-18.9.	.80	.79	.74	.78	.84	.80	.78	....	....	.82	.76	.76	.77	.78	....	.70	....	.70	.70	....	.70	.70	....	....
19-19.9.	.82	.79	.74	.82	.87	.84	.81	....	....	.85	.76	.78	.77	.78	....	.70	.70	.74	.74	....	.74	.71	.70	....
20-20.9.	.85	.79	.74	.85	.90	.88	.84	....	....	.88	.78	.82	.77	.80	....	....	.70	.78	.78	....	.78	.72	.70	....
21-21.9.	.88	.79	.74	.89	.93	.93	.88	....	....	.91	.80	.85	.77	.84	.78	....	.73	.82	.82	....	.82	.74	.70	....
22-22.9.	.92	.82	.74	.92	.96	.98	.92	....	....	.93	.84	.89	.79	.88	.78	....	.77	.87	.87	....	.86	.78	.72	....
23-23.9.	.95	.86	.77	.96	.99	1.02	.96	.84	.79	.96	.88	.93	.82	.92	.78	....	.80	.92	.92	....	.90	.82	.76	....
24-24.9.	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	.99	.91	.96	.85	.96	.82	....	.84	.97	.97	....	.94	.86	.79	....
25-25.9.	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	1.02	.95	....	.89	.99	.86	....	.88	1.01	1.01	....	.98	.90	.83	....
26-26.9.	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	1.05	.98	....	.92	1.03	.90	....	.91	1.06	1.06	....	1.02	....	....	....
27-27.9.	1.10	1.05	.88	1.11	1.12	....	1.10	1.03	.88	....	1.02	....	.96	1.06	.95	....	.95	1.10	1.10	$0.91	1.06	....	....	....
28-28.9.	1.14	1.10	.90	1.14	1.15	....	1.14	1.07	.90	....	1.06	....	.99	1.10	.99	....	.99	1.15	1.15	.94	1.10	....	....	....
29-29.9.	1.17	1.15	.93	1.18	1.18		1.17	1.12	.93	....	1.09	....	1.03	1.14	1.03	....	1.02	1.20	1.20	.98	1.14	....	....	....
30-30.9.	1.21	1.19	.95	1.22	1.21		1.21	1.17	.95	....	....	....	1.07	1.17	1.08	....	1.06	1.25	1.25	1.02	1.18	....	....	....
31-31.9.					1.24		1.24	1.22	.97	....	....	....	1.11	1.21	1.12	....	1.09	1.29	1.29	1.06				....
32-32.9.		*Elwood Terrace		....	1.27		1.27	1.27	1.00	....	....	....	1.14	1.25	1.16	....	1.13	1.34	1.34	1.09	Kettleman Hills			....
33-33.9.	....	1.28	....	....	....		....	1.32	....	....	....	....	1.18	1.28	1.20	....	1.17	1.38	1.38	1.13	....	1.19	....	....
34-34.9.	....	1.32	....	....	....		....	1.37	....	....	....	....	1.22	1.32	1.25	....	1.20	....	....	1.17	....	1.23	....	....
35-35.9.	....	1.35	....	....	....		....	1.42	....	....	....	....	1.25	....	1.29	....	....	....	....	1.20	....	1.27	....	....
36-36.9.	....	1.39	....	....	....		....	1.46	....	....	....	....	1.29	....	1.33	....	....	....	....	1.24	....	1.31	....	....
37-37.9.	....	1.43	....	....	....		....	1.51	....	....	....	....	1.32	....	1.37	....	....	....	....	1.28	....	1.35	....	....
38-38.9.	....	....	....	....	....		....	1.56	....	....	....	....	1.36	....	1.42	....	....	....	....	1.31	....	1.39	....	....
39-39.9.	....	....	....	....	....		....	1.61	....	....	....	....	1.40	....	....	....	....	....	....	1.35	....	1.43	....	....
40-40.9.	....	....	....	....	....	F. O. B. Standard Pipe Line	....	1.66	....	....	....	....	1.43	....	....	....	....	....	....	1.39	....	....	....	....
41-41.9.	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.43	....	....	....	....
42-42.9.	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.46	....	....	....	....
43-43.9.	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.50	....	....	....	....
44-44.9.	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.54	....	....	....	....
45-45.9.	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.57	....	....	....	....
46-46.9.	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.61	....	....	....	....
47-47.9.	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.65	....	....	....	....
48-48.9.	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.68	....	....	....	....

*F. o. b. ship.
‡Also McKittrick, Kern River. Kern Front and Round Mountain $0.70 thru 19.9 gravity; no higher gravity quoted.
†Wilmington prices differ on gravities below 18.9. Prices are: 14-16.9, $0.75; 17-17.9, $0.77; and 18-18.9, $0.79; rest of schedule same as Signal Hill.

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Coming Meetings

American Society of Mechanical Engineers, annual meeting, New York, N. Y., Dec. 5 to 9.
Exposition of Chemical Industries, Grand Central Palace, New York, Dec. 4 to 9.
Nebraska Petroleum Marketers, Inc., Omaha, Nebr., Dec. 6 to 8.
Oil & Gas Assn. of Michigan, annual meeting, Mt. Pleasant, Mich., Dec. 7.
West-Central Texas Oil & Gas Assn., annual meeting, Abilene, Tex., Dec. 10.

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Society of Automotive Engineers, annual meeting, Detroit, Mich., Jan. 9 to 13.
Missouri Independent Oil Jobbers Assn., annual meeting and trade exhibit, De Soto Hotel, St. Louis, Jan. 18, 19.
Northwest Petroleum Assn. (North Dakota Division), Elks Club, Fargo, N. D., Jan. 23, 24.
Oil Trades Assn. of New York, quarterly meeting, Waldorf-Astoria Hotel, New York, Jan. 24.
Northwest Petroleum Assn. (Minnesota Division), Lowry Hotel, St. Paul, Minn., Jan. 26 and 27.
Kentucky Petroleum Marketers Assn., 13th annual meeting, Brown Hotel, Louisville, Feb. 7, 8.
Ohio Petroleum Marketers Assn., Deshler-Wallick Hotel, Columbus, Feb. 7, 8, 9.
Assn. of Highway Officials of North Atlantic States, 15th annual meeting, Hotel Pennsylvania, New York, Feb. 15, 17.
Wisconsin Petroleum Assn., Milwaukee, Feb. 21, 22, 23.
Iowa Independent Oil Jobbers Assn., Hotel Fort Des Moines, Des Moines, Feb. 28, Mar. 1, 2.
American Assn. of Petroleum Geologists, Oklahoma City, Okla., March 22, 23, 24.
American Chemical Society, Baltimore, Md., April 3-7.
National Petroleum Assn., 36th semi-annual meeting, Hotel Cleveland, Cleveland, O., April 13, 14.
Oil-World Exposition, Houston, Tex., April 24 to 29.
American Institute of Mining & Metallurgical Engineers, Open Hearth Conference, Cleveland, April 26, 27, 28.
Petroleum Electric Supply Assn. and Petroleum Industry Electrical Assn., Rice Hotel, Houston, Tex., May 2-4.
Pennsylvania Grade Crude Oil Assn., annual meeting, Hotel Hershey, Hershey, Pa., June 15, 16.
13th International Congress of Carbide, Acetylene, Oxy-Acetylene Welding & Allied Industries, Munich, Germany, June 25 to July 1.

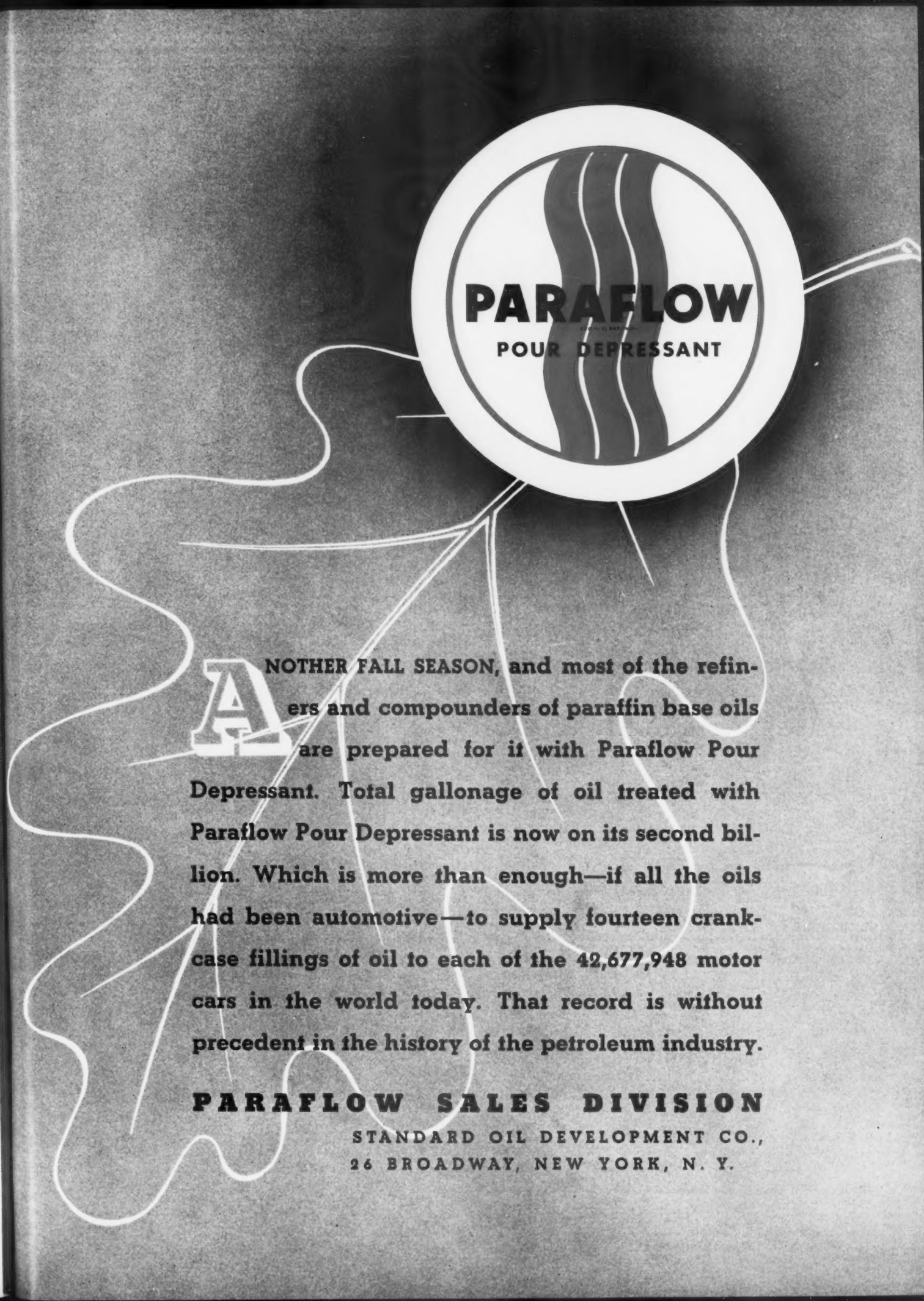
Japs Ration 'Gas'

N. P. N. News Bureau

LOS ANGELES, Nov. 12. — In line with statistics showing marked reduction in shipments of petroleum products from California to Japan during the past two months, is the report of economies and restrictions recently directed toward reducing the domestic consumption of gasoline in that country.

Private automobiles receive rations of about a gallon a day, taxicabs are allowed less than three gallons a day and are not permitted to cruise, and it is also reported that motor buses have been rerouted over shorter runs in effecting these economies.

Curtailed industrial activity, as all efforts are directed toward the China war, is also having an effect on domestic consumption of petroleum and its products by Japan.



ANOTHER FALL SEASON, and most of the refiners and compounders of paraffin base oils are prepared for it with Paraflow Pour Depressant. Total gallonage of oil treated with Paraflow Pour Depressant is now on its second billion. Which is more than enough—if all the oils had been automotive—to supply fourteen crankcase fillings of oil to each of the 42,677,948 motor cars in the world today. That record is without precedent in the history of the petroleum industry.

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James M. Flaherty

Continuing as president of the Petroleum Accountants Society of Oklahoma for a second year is James M. Flaherty of Tulsa, Shell Petroleum Corp. With this oil company since 1920, first as plant accountant at St. Louis he has been promoted through various steps in the accounting department and now is assistant-treasurer.

This is the tenth year for the Oklahoma petroleum accountants' society. R. L. Rush of Tulsa, Sinclair Prairie Oil Co. is first vice president.